The Case of Close Encounters with London Zoo's Penguins: A Sociocultural Analysis of the Construction of Environmental Perspectives

by

Monae Christine Verbeke

A THESIS

submitted to

University of Warwick
Department of Sociology

in partial fulfillment of
the requirements for the degree

Doctor of Philosophy

Presented October 2015

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Acknowledgements

First and foremost, I would like to thank my participants, who not only provided the data for my study, but also helped me test new equipment and research methods. I am also grateful to ZSL London Zoo for allowing me access to their penguin enclosure and their assistance in the design of this study.

I am particularly thankful to my primary supervisor, Dr. Eric Jensen, for his advice and guidance throughout the duration of my doctorate programme and the writing of this thesis. I sincerely appreciate, the opportunities that have been provided to myself through the cooperative work with Dr. Jensen. I have greatly benefitted from research projects in which I have assisted. I also thank Dr. Jensen for his patience and directions in guiding me through the ways of academic writing and discussing many ideas with me. I appreciate guidance given by Dr. Nicholas Lee, who provided valuable and constructive criticism in the development of my research protocol as it took several unanticipated changes. I also thank Dr. Nickie Charles and Dr. Robert Carter for their encouragement in producing a piece of work that blends my own interdisciplinary background. I thank the many colleagues who have patiently listened to me as I worked on this project; they helped me considerably.

I gratefully acknowledge the advice and support of many zoo educators, particularly grateful to Sarah Thomas, who helped propose this study and made it possible to carry out this research. I thank the zookeepers of London Zoo's Penguin Beach, as well as all staff of London Zoo, for their time and use of their facility.

I am particularly grateful to Dr. Collette Guy, who has become a lifelong friend and colleague. Collette and I met on my first day in the UK, when I traipsed into her life with all my American ideals, 3 suitcases and a dog. I couldn't have asked for a better housemate or friend, without whom I would have never explored the countryside, discovered my love for theatre or reconnected with my childhood passion of riding. I thank Collette for reading drafts of this manuscript, providing constant feedback on my research and for many roast dinners. Collette, as well as her three dogs (Lola, Fanta and Tango), made England feel like home to me.

I am indebted to my family, who has supported me from the beginning of my education. There are few people on this planet that have a family as connected and caring. While I may be the first to earn a doctorate degree, my family has earned this through their unwavering support. My mother, Ann Belton, deserves a special mention for her constant love and encouragement. I am thankful for the close relationship I have with my mother. Although I have been far from home, without her continuous support I never would have been able to achieve my goals. She has selflessly given more to me than I ever could have asked. I also thank my step-dad, Ron Belton, for teaching me the art of debate. While we may not often come to agreement (indeed, I often found them exasperating), the time we've spent defending our ideas has served me well in finding my academic voice. I will always enjoy and cherish our long hours of discussion, for without those hours I may have never learned to defend my own ideals. Finally, I thank my dog, Chase. Chase has travelled thousands of miles to sit by my side, as I have written this

thesis. In the 10 years of his life, he has listened to me read drafts of my writing, rode with me to explore the ends of the world and ultimately been my family.

Declaration

I declare that the contents of this thesis are my own work and that no material contained in this thesis has been submitted for a degree at another university nor published elsewhere.

Monae C. Verbeke

Summary

This thesis explores the construction and negotiation of zoos as spaces for public engagement with the environment, forming part of the field of science communication and environmental sociology. In addressing how social interactions in human-animal encounters serve to act as a facilitation mechanism, this research analyses how cultural change in environmental science occurs. A case study is presented of penguin encounter participants at the Zoological Society of London (ZSL), analysing visitor performance and cultural representations of zoos. The research explores how social interactions unfold in the zoological space by investigating the sociocultural ways through which visitors direct and enhance their personal and co-visitors' meaning making. Ten participant performances were analysed in the context of joint encounters. Their performances were further analysed through their personal attitudes, as well as the sociocultural and institutional context of each encounter. Quantitative and qualitative data were gathered using questionnaires, observations and document analysis. Two patterns of discourse have been identified: the negotiation of environmental experts and engagement with environment through understandings of risk. From each of these themes, key points in the experiences were used in the construction of the Trajectory Equifinality Model (TEM) of expertise and risk. The TEM uses individual cases to develop a clear understanding of the penguin encounters role in broader science communication practices. Ultimately, this research details how participant interactions with individual animals can encourage zoo visitors to build ex-situ species level environmental concern.

Chapter 1. Introduction

1.1. Range and Scope

The aim of this thesis is to explore the influence of environmental science communication within the space of a penguin encounter programme occurring within a UK zoo. This research is carried out within the wider context of environmental sociology and human-animal interactions. The research was undertaken in London, during the summer of 2013.

To begin, the foundation of this study is located in the notion that there are pro-environmental behaviours, which are universally understood as beneficial to improving the environmental crisis position (discussed further in Chapter 2 and Chapter 5). Kollmuss & Agyeman (2002) define pro-environmental behaviours as "behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world" (p. 240), thus maximizing the individual's potential to benefit other people and the environment (Thøgersen 1996). It is within this definition of pro-environmental behaviours that this thesis explores the influence of environmental science communication in the Zoological Society of London (ZSL) London Zoo's Penguin Encounters.

This research investigates the lack of understanding regarding the influences that encourage publics to commit to pro-environmental behaviour and how zoos can combine science communication and their animal capital to encourage pro-environmental attitudes. It is not well understood what underlying factors

encourage or discourage public support for pro-environmental issues. Furthermore, prior research fails to describe what science communication practices are most successful in empowering participants to engage with environmental issues through their own actions. What research has described is the transcendence of environmental issues beyond scientific, political and mass media into the social sphere (Miller, 2002). With this in mind, it is not surprising environmental issues are subjective and individually understood by publics. One of the fundamental issues is the role of the scientist in the public's perception of the environment, and the extent to which their perceptions could be considered as a social practice. Still missing is research on what science communication mechanisms are most successful in encouraging publics to participate in environmental matters, certainly research on the mechanisms used in zoos to encourage such action.

Science communication researchers such as Irwin (1995), Jensen and Holliman (2009), and Lock (2011) have established a strong foundation for researching social implications of communication strategies. Whilst Haraway (2008), Walsh (2009), Ballantyne et al. (2007), and Charles and Davies (2008) have discussed the implications of human-animal interactions, but little is known about the dynamics of these two fields and process of applying the latter field to the practice of environmental communication. A better understanding of how human-animal encounters can serve as mechanisms to encourage publics to consider pro-environmental behaviours, fostering their participation in pro-environmental behaviours and shifting perceptions of environmental issues is critical.

Within the field of science communication, much is said about the importance of engaging publics in environmental science communication. The global concern with environmental degradation demands a concerted, international effort. Across several societies, environmental sociology methods, including research on social learning, are argued to be one of the best approaches for society to respond to environmental crisis concerns (Goodall, 2008). Thus far, most science communication strategies have focused on a public deficit model (Irwin, 1995), operating under the assumption that by simply learning about the environment the public will transform their pro-environmental behaviours. These ideas form the foundation of zoo education programmes, yet little is known about how zoos act as a mechanism in prompting pro-environmental public attitudes through environmental science communication and engagement. The use of science communication in informal learning is an increasingly central facet encouraging cultural change (Bell, 2009; Jensen 2013; Jensen & Wagoner 2009; Falk, 2007).

Situated in this global environmental education movement, zoos' informal learning programmes advocate for pro-environmental behaviours in an international effort to address environmental problems through cultural change. Indeed, one of the most fundamental roles of modern zoos is as a defender of threatened spaces, often by means of acting as a community facilitator. A considerable amount of research has been conducted on the individual benefits of participating in activities provided by informal learning organisations. One particularly striking, but understudied, education programme is animal encounters.

Through anecdotal discussion with zoo educators, zoos framed the encounters as a unique experience for visitors, through which participants may interact with animals, potentially building emotional bonds. From this perspective, the development of emotional bonds with animals would lead to a sense of empathy for animals and responsibility to protect their habitat. In an initial attempt to understand how participation human-animal interactions function as a science communication space, taking into account the external social forces, the questions resulting from this research focus on the environmental perceptions of Penguin Encounter participants at ZSL.

1.2. Prior Research in Environmental Science Communication, Zoo Education and Human-Animal Interactions

1.2.1. Introduction

The literature for this thesis is broadly situated in two fields: science communication and human-animal studies. This chapter explores existing perspectives on the impacts of in science communication, and what the patterns of attitude change might signify. The literature in this chapter takes this framework and explores how the zoos function as a site for communicating conservation issues, through mediated human-animal interactions. In the first section I give a brief overview of the development of science communication practices, whilst the second section discusses how the historical influences of human-animal interactions within cultural spaces.

The concepts underpinning this research arise from the Article 13 of the UN Convention on Biodiversity's (1992) mission for improved pro-environmental attitudes amongst publics, as well as the House of Lords' (2000) explicit mission to create broader, more inclusive practices in public engagement. However, despite several a decades of changes in environmental communication strategies through cultural organisations, research suggests that greater improvements are needed if environmental conservation organisations hope to improve publics' pro-environmental attitudes and behaviours (Jensen, 2015; Ipsos MORI, 2011; Aoyagi-Usui et. al., 2003; Kollmuss and Agyeman, 2002). Indeed, cultural organisations play a role in the sociocultural dimensions of publics understanding of environmental issues. By creating a space for exploring the sociocultural aspects of science education we can study publics cultural values of sustainability (Lemke, 2001; Shanahan and Nieswandt, 2011). Zoos are a primary cultural organisation participating in these public discussions, amongst other organisations such as natural history museums and wildlife societies. Zoos seek to fulfil a local in the public understanding of environmental science through educating and engaging publics in sustainability and conservation-related conversations. In order to understand the mission of science communication within zoo interpretative activities, including identifying what activities may prove most effective in developing pro-environmental attitudes, I turn now to exploring the role of environment-based, science communication in public engagement.

1.2.2. Science Communication Practices

To explore how the field of science communication is important in developing interpretation in human-animal encounters, we must first understand the role of science communication more broadly within the context of culture and society. Science communication, as a field, has been framed as a key site for debating science and society issues, whilst also negotiating the relationships between publics and science. More generally, in studying the presence of science in daily life, environmental science increasingly viewed in terms of environmental risk, whether as species loss, climate change or animal interactions, including issues of expert-led decisions on the role of science within society and culture (Ravetz, 2005; Beck, 1992; Giddens, 1990). Thus, it is no surprise that the growth of science in society saw a growth in public concern over the course of the latter-twentieth century resulting in calls for science, and science policy, to be opened up for public participation (Gregory & Miller, 1998; Nelkin, 1995; Wynne, 2006).

In negotiating the role between science and society, the House of Lords *Science and Society* report (2000) demanded increased public engagement with science, building on the early work of the Royal Society report, *The Public*

Understanding of Science (1985)[1], prompting the public understanding of science movement. These early science communication strategies were based on one-way communication to the public. In the Public Understanding of Science (PUS) model of communication, experts led communication sessions to address ignorance in the public, largely known as the deficit model (Wynne, 2006; Osborne, Simon, & Collins, 2003; Irwin and Wynne, 1996; Wynne, 1992). The implications of this model suggested that if publics were sufficiently exposed to science, they would both learn to appreciate science, whilst also learning to make 'good' science decisions (Irwin and Wynne, 1996). Rationally, the deficit model was widely criticised as one-sided, with the public as non-engaged, excluded, at risk or somehow lacking knowledge and consequently identified as needing science-based intervention (Irwin & Wynne, 1996; Michael, 2002). PUS was also criticised for ignoring the diversity of 'the public'. Certainly, the PUS model fails to recognise how individuals may hold their own science-based knowledge. Thus, a shift towards mutually beneficial model, an engagement model, appeared at the turn of the century.

[1] Also known as the *Bodmer Report*

Public engagement positions the relationships between publics, scientists and policy makers as one of mutually beneficial, with each being able to learn from one another. This shift can be seen in the differences between two policy documents, mentioned above. Certainly, the difference can be seen in how public engagement model is framed as participatory practice, which recognises the different knowledges that can be shared by the variety of publics (Bauer, Allum, & Miller, 2007). Yet, even with this public statement of transformation in science communication practice, science engagement has been criticised for the continued presence of deficit models of interpretation (Jensen, 2015; Wilkinson, Bultitude and Dawson, 2011; Jensen and Wagoner, 2009; Kurath & Gisler, 2009). By continuing to use the deficit model of science communication, science communicators fail to acknowledge publics' own knowledge and thus run the risk of failing to engage publics in their interpretive strategies (Marres, 2005; Irwin & Michael, 2003).

1.2.3. Science Learning and Zoos

Even with arguments for increased distancing from the deficit model of science communication, arguments for the need for publics to 'learn science' are widespread. Education researchers and practitioners argue that given the extensive nature of science's presence in culture, publics should participate in science learning programmes (Alexander, Johnson and Kelley, 2012; Falk and Dierking, 2010; Dillon, 2009; Osborne & Dillon, 2007). Science learning in culture often occurs through places such as: museums, science centres, science festivals, zoos and aquaria, often referred to as informal for science learning organisations (e.g. Falk,

2009; Osborne & Dillon, 2007). Learning that transpires in these situated-environments is a socially mediated process in which individuals construct meaning through interactions (Cole, 1996; Vygotsky, 1978). Using this social definition of learning, learning includes more than just the cognitive mastery of facts or skills. In this definition, learning also participant's changes in attitudes, interests, and behaviours (Penuel & Wertsch, 1995; Vygotsky, 1978; Wenger, 1998). Learning involves a diversity of sociocultural processes, which are assimilated into the learners' previously held attitudes, behaviours and experiences (Brown & Duguid, 2001; Vygotsky, 1978).

Suffice it to say that science communication, and the ideological notion of public engagement connected with it, is unsuccessful in fracturing the expert-driven practices of science learning. Thus, learning research in zoos has largely failed due to attempts to only measure transmission of knowledge, or, as previously mentioned, programmes that are formed on the basis of visitor deficit. If instead, zoos more widely applied the sociocultural theory of learning to incorporate how visitors may learn from those within their Zone of Proximal Development (ZPD), we may begin to understand how the experience of attending a zoo influences participant's attitudes and behaviours (Vygotsky, 1978). What is crucial in this view of learning is the creation of spaces where exchanges of information can occur that will build on learner's prior existing competences.

Given the role of zoos in contemporary environmental science communication, opportunities to engage with the social and cultural aspects of

environmental science via zoos is often understood as valuable. As the global population becomes more urbanized, zoos are often one of the only places in which urban dwellers can 'experience' the natural world. Thus, zoos have been culturally as the key facilitator of public-environmental relationships, seeking to improve the public's pro-environmental attitudes (Falk *et al*. 2007; Rabb 2004; Knowles 2003). Environmental policies, such as Article 13 of the UN Convention on Biodiversity, are fundamental to the development of zoos' environmental science communication strategies. In order to create more effective zoo-based environmental science communication has sought to understand how visitors learn from zoo-based interpretation strategies. That is to say, the emphasis of science communication in zoos predominantly focuses on traditional learning, with measurable outcomes, oriented towards the deficit model. To date, learning in zoos has been explored in terms of performativity and conversation analysis (Patrick, *et. al.*, 2013; Ross *et al*., 2012), impacts to pro-environmental attitudes (Jensen, 2014) or aspects of different identity theories (Falk, 2009; Rahm & Ash, 2008). Fundamentally, the results of these studies offer explanations of visitor learning resulting from science interpretation activities (Ogden and Heimlich, 2009) and not on the potential impacts of the emotional dimensions of human-animal interactions on pro-environmental attitudes and behaviours. This research seeks to fulfil what has been identified as a deficit in the quality of evidence of the emotional and cognitive dimensions of zoo-based science communication activities.

1.2.4. Human-Animal Interaction Dimensions

The history of human-animal interactions is long and complex. Yet, the social study of human-animal interactions is relatively new. Within sociology, studies of human-animal interactions have been examined when trying to understand the spaces animals occupy in human social and cultural spaces (e.g. Charles and Davies, 2008; Hemsworth, 2003; Irvine, 2002; Serpell, 1986). The anthropology of human-animal interaction have been well studied (e.g. Palmer, Malone and Park, 2015; Clutton-Brock, 1999; Descola and Pálsson, 1996), even of the dynamics between humans and domestic pets are growing by leaps and bounds (Irvine, 2013; Brackenridge et. al., 2012; Charles and Davies, 2008).

A number of studies have examined the dimensions of human-animal relationships from the psychological perspective of the role of pets in therapy (Brickel, 1979; Corson, Corson, and Gwynne, 1975) and social role of pets in social contexts, such as families (e.g. Charles and Davies, 2011; Strathern, 1992; Albert and Bulcroft, 1988). Yet research studies into human-animal relationships, which transcend the superficial species barrier between the human and captive, non-domestic animals, have recently come into question (Rowlands, 2002). These social studies of interactions between humans and captive non-domestic animals are still under-developed. While the breadth of human-animal relations is beyond the scope of this research, the power relations between them are important to understanding what occurs in zoo encounters.

The study of human-animal interactions, coupled with post-modernist critiques of traditional Western dichotomies, such as those in traditional views of gender and identity, have led the sociological re-examination of the social relationship between humans and other animals (Wilkie and McKinnon, 2013; Carter and Charles, 2011; Lawrence 1995). Within this Western humanist epistemology, human-animal interactions are strictly relationships of power, with animals falling prey to human command. Sollund (2011) theorises human-animal interactions as "chiefly organized around humans' own consumption and 'needs'", without consideration of the potential for the animals' needs (p. 437). In the latest "post-humanist" perspective, the human-animal divide is a false dichotomy, and interactions between humans and animals cannot be simply described as relationships of power inequality. Rather all human and nonhuman animal actors have the ability to influence all other human-animal interactions (Haraway 2008, 2003). Yet, Haraway argues this is the sole basis of the human exceptionalism, in which humans assume: (1) humans are unequivocally distinct from non-human animals, (2) in their distinctness humans are superior to animals, and (3) humans always have absolute power within the human-animal relationship (Haraway 2008, 2003).

These power relations are ever more present within the boundaries of zoos, where the relationships between humans and other animals are marked by the power of humans over the captive animals. Zoos are a complex location for publics to explore the boundaries of human-animal, human-environment relationships, in

which visitors are encouraged to interact with and learn about animals. Prior researchers suggest the captivity and exhibition of animals increases zoo visitors' feelings of superiority. Indeed, keeping captive animals does not increase visitors' pro-environmental attitudes or behaviours but instead reinforces ideas of human exceptionalism (Coe and Wertsch, 1996). Humans and animals within a captive context, certainly within the context of a zoo, hold unequal power. Yet, with the post-humanist movement, zoos have turned their awareness to the influence of humans on their animal inhabitants and vice versa. It is not surprising then that a number of the zoological studies conducted on the influence of humans on animals have found the zoo's inhabitants are highly influenced by their interactions with visitors (Clayton et al., 2009; Davey 2007; Davis, Schaffner and Smith 2005; Hosey 2000; Mitchell, *et a!*. 1992). These studies evaluate a spectrum of visitor-animal interaction, with studies on one end of the spectrum researching the affects of visitor presence and evaluation on the other end of the spectrum researching contact sessions between the two species. Research on the effects of human-animal interactions in zoos does not indicate substantial negative impacts on the animals' physiological or psychological wellbeing (Collins and Marples, 2015; Sherwen, S. L., Hemsworth, *et. a!.*, 2015; Farrand, *et. a!.*, 2014). In other contexts, human-animal contact actually appears to have a beneficial impact on the animals (Jackson and Hackett, 2007; Rushen, et al., 1999; Markowitz, et al., 1998). In considering human-animal interactions, learning research also turns to explore the dimensions of the impacts to visitors by interacting with animals.

Research suggests visitor learning can be positively influenced through interactions with species. For instance, Kreger and Mench's (1995) views rest on the assumption that visitor willingness to pay for animal encounter experiences "indicates that this human-animal bond may be the most effective way for the zoo to communicate its educational message to the visitor" (p. 155). Within the last five years a slowly growing body of literature has been devoted to researching Kreger and Mench's assumptions. Of these studies, one of the most robust studies is an impact evaluation on student's attitudes towards animals prior to and following an animal encounter session. Stanford suggests that seeing and touching animals improved visitor attitudes towards animals. In comparison, a study by Webb and Drummond asked participants of dolphin-encounters to report feelings of wellbeing and anxiety and swimming with dolphins increased feelings of wellbeing and lowered anxiety (2001).

While previous research studies on human-animal interaction sessions with animals are extremely limited, and the conditions are not directly parallel to the interactive activity in the present study, they do provide a framework for understanding the phenomenon. The research studies indicate that the unique experience of interacting with captive non-domestic animals may change the relationship between publics and natural sciences. However unlike previous studies, this research will investigate both the sociocultural factors that appear to influence the participants' established pro-environmental attitudes, as well as the factors arising from the Penguin Encounter that impacts the participants' pro-

environmental attitudes. Published research on visitor impacts is highly limited within the impact of human-animal interactions within zoo, because most of studies focus exclusively on post-visit evaluation and/or behavioural analysis of the animal species. The question of impacts beyond self-report is important for such human-animal interactions in zoos, which have goals that are significantly broader than increasing financial profits or simply allowing publics the opportunity to come into contact with non-domestic animal species.

1.3. Research questions

This thesis is structured around four research questions:

1. What prior cultural experiences influence participant's pre-visit pro-environmental attitudes? Following on from this, how do those cultural influences shape the Penguin Encounter experience?
2. How do interactions between participants, penguins and zookeepers vary given a variety of environmental education discourse?
3. What factors arising from the Penguins Encounters have the greatest implications for impacting participant trajectories?
4. In what ways are pro-environmental attitudes and behaviours negotiated through discourses of environmental crisis?
5. How are penguins positioned as social actors, influencing participant experiences? Ultimately, how does the construction of penguins contribute to environmental conservation?

1.3.1. Question Justification

Focusing on the above research questions, this research explores the experiences and implications of environmental science communication. In doing so,

it is necessary to understand the potential influences, including social, political and media, on participant perceptions of environmental issues. Additionally, it is essential more substantive evidence is gathered to critically examine how and if learning and culture change takes place in these sessions or if the sessions are glorified entertainment and marketing ploys. To research these questions, this thesis uses a methodological approach that focuses on the paths of participants, as they incorporate and construct their perspectives. In particular, I seek to uncover how participants understand their experiences and what experiences add meaning to their environmental attitudes. In doing so, this methodology draws from a constructivist, interpretivist approach. In composing this methodology, the research utilised a multi-method approach, employing pre- and post- surveys, drawings, document analysis and observations of the encounter.

This thesis argues that environmental sociology needs to understand zoo experiences, certainly interactive sessions such as animal encounters, as part of the construct of individuals' participation in environmental issues. By examining the nature of interactions between participants, the penguins and ZSL, I examine how these interactions influence participant positions, and how such positions develop. Two central themes arose from this analysis: the signification of expertise in articulating and participating in environmental communication and the construction of environmental risk governing the discourse of zoos and the Penguin Encounter. In examining these themes, I place the Penguin Encounters within the

larger construct of environmental science communication, connecting participant experiences to their lived experiences and wider-social practices.

1.4. Thesis Outline

1.4.1. Chapter 2: Methodology

This chapter outlines the methodological approach, combining two sociocultural studies approaches, including discourse analysis with a recent ethnographic approach of mapping potential trajectories of participants. I discuss the multiple tools used to systematically collect the attitudes and behaviours of participants, whilst also discussing how the Trajectory Equifinality Model can be employed to illustrate potential influences of participant experiences. I also explore some of the challenges facing this method of analysis, and challenges of conducting research in zoos.

1.4.2. Chapter 3: Expertise

Chapter 4 begins with a general discussion of the construction of zoos as a social resource of environmental expertise, exploring the distinction drawn between lay publics and scientific accounts of the environmental issues. It then explores how the ideas of expertise and public engagement with environmental issues are produced from both the institution and participants. The chapter also explores the recognition of zookeeper expertise in light of media influences. The chapter suggests that whilst people have complex and diverse experiences, the primary influence in participants' engagement in the Penguin Encounter originates

in the contention between prior recognition of environmental expertise and assertions of expertise by ZSL. Ultimately, the contention influences participants' openness to ZSL's pro-environmental messages.

1.4.3. Chapter 4: Environmental Risk

In the second analytical chapter, this thesis analyses the construction of environmental risk perceptions through risk discourses and perceptions of risky behaviour. In the first section of the chapter, institutional construction of discourses of risk is examined. In the second section of the chapter, conversations between keepers and participants are analysed in light of participant perceptions of, and interactions with, penguins, exploring how participants perceive penguins as a source of risk.

1.4.4. Chapter 5: Conclusions: Implications and Directions for Future Research

The final chapter draws together the thesis by outlining the main findings of the study and the contribution to knowledge. By describing the implications of this study, this chapter will identify future directions for research based on the findings described in Chapter 4 and Chapter 5. The central discussions of the chapter will focus on the limitations of the study's methodological and theoretical underpinnings, outlining potential future directions of research.

Chapter 2. Methodology

2.1. Introduction

This chapter describes the methodology and methods used to collect and analyse data for the purposes of this thesis. The purpose of this mixed methods study was to establish the degree to which differences in attitude within human-animal interactions (HAI) exist before and after interacting with penguins in a close-encounter experience, in order to investigate the impacts of participating in such experiences and to help define the factors that influence participants' relationships with animals in the context of wildlife institutions. The chapter begins by giving an account of the methodology employed for the analysis of the trajectories of the explored human-animal interaction, followed by a brief description of the exploratory study conducted, and then describes in detail the methods used in the qualitative and quantitative stages of the primary study. The discussion of the research method and design includes participant descriptions and selection processes, materials and instruments utilised in data collection and the operational definitions of study variables. The chapter concludes with a review of limitations and ethical assurances of the study.

2.2. Trajectory Equifinality Model

The study of human-animal interactions and environmental science communication has been studied from a variety of angles and using a variety of methods. With the magnitude of this question in mind, this writer sought not to conduct an independent, thorough analysis of the capacity for human-animal

relationships within the context of an environmental science communication programme, but instead to produce a framework for understanding the potential for environmental learning through the lens of animal-interactions in a zoo.

The framework guiding this study was based on the Trajectory Equifinality Model. The Trajectory Equifinality Model (TEM) arose from the field of sociocultural psychology (Sato et al., 2007; Sato et al., 2009), as an alternative theory to the life course paradigm (Sato et al., 2009, pg. 217). Prior to explaining TEM, one needs to understand sociocultural psychology, and its relation to cultural sociology. In the same sense that cultural sociology seeks to understand the social construction of cultural products and expressions, sociocultural psychology explores the ways in which outside cultural influences impact individual development. Cultural sociology and sociocultural psychology theories were blended to explore the potential for the development of bonds between human and non-human animals by analysing how experiences are used to interpret encounters with animals and ideas over time.

2.2.1. Vygotsky's Model of the Sociocultural Process

The basis of TEM resides in Vygotsky's sociocultural theories. Vygotsky's argued human development was led by social systems, in which individual development, including mental function, had its origins in social contexts (Vygotsky, 1978). Vygotsky framed individual development as a process occurring through interaction with other individuals in a social context, transforming and integrating shared activities into individual's personal construct. In this pragmatic model, social

tools and signs mediate the social interactions, playing a fundamental role in the development of the personal construct (John-Steiner and Mahn, 1996).

The social tools included systems for understanding body language and verbal language (Vygotsky, 1982). The social tools assisted individuals in understanding and mediating their social interactions, including individuals' feelings and behaviours. Indeed, Vygotsky expressed that such tools could not be constructed by the individual, but must be products of sociocultural development (John-Steiner and Mahn, 1996). For Vygotsky, it is culture that presents the individual with the tools necessary to develop as an individual. This development can be constructed and influenced by a number of social actors, who possess the tools to guide the individual along a number of social paths.

2.2.2. Trajectory Equifinality Model

In Vygotsky's constructivist approach, he suggests developmental processes are mediated by a number of cultural tools and signs. Using the Trajectory Equifinality Model, such cultural signs are used to understand how the individual, depicting their life trajectory through time, embodies passages through cultural processes. Thus, the mapping of such pathways can be used as signifiers of future experiences, as each individual sign is a pathway to another, producing different trajectories (Sato et al., 2009; Valsiner, 2009). TEM contrasts with previous studies of life-course, which ignore the dynamics of a lived life through time (Sato, et al., 2007). Instead, TEM takes interest in the individual subject: taking into account not only the current state of the individual but also the paths from which the individual

has come (Sato, et al., 2009). The individual is understood to be a compilation of life choices which have taken place over time, the individual cannot simply be accounted for due to their current place – the individual is active (Sato et al. 2009; Valsiner, 2009). TEM provides insight into how the sociocultural phenomena effects and helps shape the life of the individual (Valsiner, 2009). Indeed, it is the individual's own unique history of social, societal and cultural influences which provide the framework for the individual's future decisions (Valsiner, 2009). For example, in the study of human-animal interactions, the individual's past experiences with the other animals, including the social and cultural circumstances that surround such experiences drive and influence the future social and cultural experiences of the individual. These trajectories are comprised of several points, each adding to the individual's lifecycle (Sato et al., 2009).

2.2.2.1. Equifinality Points.

Equifinality Points (EFP) are instances along an individual's trajectory that may be shared by more than one individual (Sato *et. al.*, 2007; Valsiner, 2009). EFPs are the first step in comparing individuals in research, as they are the temporary places each individual comes to along their individual trajectory that they may share with another (Sato *et. al.*, 2007). Similarly to individuals stopped along the motorway, each as paused at a temporary place, but has arrived in this place from varied routes. These varied routes influence the individual's future destination. Yet, this point does not imply that individuals are the same. Indeed, EFPs are simply "a region of similarity in the temporal courses of different trajectories" (Sato et al.

2009, p. 226). It is the goal of research to identify the common EFPs, examining the individual's evolution of trajectories.

2.2.2.2. Bifurcation Points

Bifurcation Points (BFP) are decision points along the trajectory. BFPs refer to the important crossroads along the trajectory, where individuals must make a decision on one of at least two paths they may follow (Sato et al. 2009). These decisions are not always conscious, but never-the-less lead to a set of alternative outcomes. Although the individual may eventually arrive at a similar EFP that they may have done if they were to have chosen an alternative path, this BFP will ultimately influence the individual's trajectory.

2.2.2.3. Obligatory Passage Points

Obligatory Passage Points (OPP) refers to an obligatory passage an individual must through in order to reach an EFP (Sato et al. 2009). Actor-Network Theory (ANT) first described OPP's as the points in which actors were forced to converge along their network (Law, 1992). In this sense, OPPs are framed as a required element of the individuals' trajectories, mediating the autonomy of the individuals. Within the frame of this research, each individual must present the ZSL keeper with a valid ticket (OPP) to gain entrance into the penguins' enclosure.

2.2.2.4. Synthesized Personal Orientation

Synthesized Personal Orientation (SPO) is the individual's personal orientation presented through their values and aspirations. Individual trajectories are often orientated to these aspirations, but are instead forced to change direction due to unforeseen OPPs (Sato et al., 2009).

2.2.2.5. Social Direction

Social Directions (SD) are the prescriptive social and cultural forces that characterise traditions, social norms and social pressure (Sato et al., 2009). These social directions are the internal structures, which constitute the sociocultural framework that exists outside of the individual (Sato el al., 2009).

2.2.2.6. Social Guidance

Social Guidance (SG) is the conflicting power of social direction (Sato and Valsiner, 2010). SG is the social support an individual received from other social actors in achieving their SPO (Sato and Valsiner, 2010).

2.2.2.7. Application to Science Communication Research

Using the data from this mixed-methods approach to science communication, this study aims to construct the trajectory of ten Penguin Encounter participation courses. Individual trajectories will be constructed for each participant from the time of their pre-test interview through their post-test interview. To construct each trajectory Equifinality Points, Obligatory Passage Points and Bifurcation Points are identified to demonstrate how, and to what

extent, interactions with penguins, within the confines of a wildlife institution, assist in constructing human-animal relationships.

2.3. Mixed-Methods Design

Based on the conclusions drawn from the literature review in Chapter 2, I argue that a mixed methodology approach is most appropriate in examining the contextual determinants and dimensions of the human-animal relationship, within the context of a visitor study at London Zoo. Mixed-methods research refers to the use of two or more methods in a research study, which yield qualitative and quantitative data (Greene, 2007; Teddlie & Tashakkori, 2009). This research study employed three qualitative methods and one quantitative method, as neither a quantitative nor a qualitative research design would have been sufficient to address the research problem (Creswell & Piano Clark, 2011; Teddlie & Tashakkori, 2009).

This research design is characterised by a pragmatic orientation. The rational for which was framed in the belief that knowledge is both constructed and a function of organism-environment transactions (Biesta and Burbules, 2003). The focus of such research lies in the Deweyan notion that social transactions represent the changes an individual undergoes within his/her social environment (Biesta and Burbules, 2003). Dewey's operated under the pragmatic assumption that:

> "[Experiences] are the products of discrimination, and hence can be understood only as we take into account the total normal experience in which both inner and outer factors are so incorporated that each has lost its special character. In an experience, things and events belonging to the world, physical and social, are transformed through the human context they enter, while the live creature is changed and developed

> through its intercourse with things previously external to it." (Dewey, 1981, p. 251)

Using this ontology, individuals were expected to present multiple realities, due to the variation in the individuals' prior experiences with other animals. This pragmatic view of the human-animal interactions informs our understanding of the way in which the environment may come to be continuously manipulated by the individual experience, through which the individual creates his/her own understandings of the environment and animal species (Green and Hall, 2010). This pragmatic stance advocates for approaches that are designed in ways that offer the best opportunities for answering the research question (Green and Hall, 2010).

To explore the contexts, content and processes (i.e. transactions) of science communication, mediated by human-animal interactions, a mixed methods framework was established (Mearns, 2008; Pettigrew, Woodman and Cameron, 2001). The research used a qualitative dominant mixed methods study to capture the complexity of the development of human-animal relationships (Creswell, Shope, Plano Clark, & Green, 2006; Lisle, 2011). This design encapsulated the notion that

> "A 'qualitatively driven' approach to mixing methods offers enormous potential for generating new ways of understanding the complexities and contexts of social experience, and for enhancing our capacities for social explanation and generalization. Such an approach can draw on and extend some of the best principles of qualitative enquiry. In the process, it can benefit from ways in which qualitative researchers have sought to develop constructivist epistemologies, and to engage with thorny methodological issues especially around questions of interpretation and explanation." (Mason, 2006, p. 10)

The mixed method approach was orientated around explicitly identified research hypotheses that aimed to detect differences in attitude towards human-animal relationships amongst human participants, who interacted with penguins in close-encounters. These mixed methods (as presented below) were chosen as the best-suited methods to answer the associated research questions (as presented in Chapter 1).

During the pre-test and post-test phases, the primary method used to gather participants' opinions and experiences was a quantitative approach, which enabled impacts claims to be made as a result of the interactions (Greene, 2005; Teddlie & Tashakkori, 2009; Creswell & Piano Clark, 2011; Jensen, 2014). The quantitative approach was the appropriate choice to investigate the relationship between the variables of attitude prior to and following the encounter, as this approach provided a definitive variable of measure that could be used to gauge the impact of such an experience before and after the intervention. Due to the nature of the explanatory design of this mixed methods research study, the study was able to further seek explanation, and interpretation, of the quantitative data by collecting and analysing additional qualitative data (Teddlie & Tashakkori, 2009).

These quantitative questions required the addition of qualitative methods (interviews and drawings) to encourage participants to provide their own explanations and reflections (Teddlie & Tashakkori, 2009; Roulston, 2010; Bryman, 2012). This could not be achieved through the sole use of quantitative methods, as the results of quantitative methods were too simplistic (Teddlie & Tashakkori,

2009). The qualitative results offered further explanation and elaboration by exploring the participant's viewpoints and experiences regarding the phenomenon of participation in animal encounters (Creswell & Piano Clark, 2011; Plowright, 2011).

The intra-test phase of the research was exclusively led by a qualitative approach. The video observation and narrative analysis was necessary to help explain, interpret, and expound on the results found in the pre-test and post-test phases (Teddlie & Tashakkori, 2009).

Each of these methods contributed to the meta-inferences of human-animal relationships proposed in the following chapters, as well as to broadening the understanding of the research constructs in human-animal interaction research (Teddlie & Tashakkori, 2009).

2.4. Exploratory Study

Three phases of exploratory study were conducted in the design of this research: phase 1: questionnaire design, phase 2: Chester Zoo study and phase 3: participant selection at London Zoo. In this section, the methods used in each of these phases are briefly described. The resulting findings are discussed and further used to develop the rationale and methodology for the primary study.

2.4.1. Phase 1

Phase one of the exploratory study refined and further developed the survey instrument. Participants were derived from a sample of sociology undergraduate students sitting a research methods course. These students were selected based on their perceived ability to critically evaluate the research tool, as they were trained in developing "sophisticated and practical research skills involved in research design", and would provide a large sample audience. Although the students were not known to be of similar demography to the primary study participants, their participation was considered critical to the development of the tool.

In this phase, participants responded to and critiqued the questionnaire instrument, using the following method. Pre-test questionnaires were comprised of quantitative and qualitative questions derived from previous studies in human-animal interactions and publications in visitor studies. Questionnaires were distributed to half of the participants (*n*=33). The questionnaire consisted of mixed-methods questions, chosen based on the range of data that would originate. Questions included: drawings, thought-listing questions, open-ended questions and Likert-scales. Questionnaires were designed to gather information on the participant's preconceived ideas of penguins, measure participant's attitudes in relation to penguins (discussed further in section 2.5.3). Post-test questionnaires comprised of complementary questions to the pre-test, with reiterations of drawings, though-listing questions, open-ended questions and Likert-scales. The

data from the pilot questionnaires were assessed for the extensiveness and relevance of the participants' responses to the research questions.

2.4.2. Phase 2

Phase two of the exploratory study primarily concerned gaining institutional participation. Two wildlife institutions were chosen to participate in the study, due to their similar offering of human-animal interactive programmes. The initial study site chosen was Chester Zoo (as detailed in 2.5.2), due in part to the Zoo's interest in the topic and the creditability of the Zoo. Chester Zoo had claimed interest in studying the potential influences of human-animal interactions in building human-animal bonds with 'wild' animals, as a means to building human connections with nature conservation.

As Chester Zoo required "experience encounters" to be purchased and scheduled in advance of the encounter, the Zoo held personal details of each participant. These details were to be used to randomly select days for research, using a random number sequence. 10 days were randomly selected from the schedule for investigation, providing a sample of 20 participants of varying demographics. At this stage, zoo staff was notified of the selected days, to allow staff to contact 'experience encounter' participants, visiting on those days, to seek their agreement to participate in the study. At this stage, the researcher was required to negotiate with staff over concerns that contacting individuals may lead to 'gift experiences' being made aware to the experience encounter participant or that individuals may have protested their details be given to a third party. It was

agreed staff, from Chester Zoo, would contact the individuals, whom they knew were not 'gift experience' receivers to seek their participation. Following this agreement, the aforementioned staff left Chester Zoo, whom then hired a new member of staff to cover the position. This replacement took 4 months, during which time no progress was made in contacting potential study participants. Upon the hiring of the new member of staff, the researcher was required to change the method of sampling individuals. The staff provided the researcher with a list of preselected days from which to randomly sample and was asked to only sample 6 dates. Given the methodology, 6 dates would have provided a sufficient sample size. Six dates were randomly sampled and given to the staff, so to contact the experience encounter participants to seek their participation in this study.

Two participants from the first day were contacted and agreed to participate. Participants were sent the form to consent via email, which was collected prior to the beginning of the 'experience encounter'. On the day, only one of the participants attended the 'experience encounter'. This 'experience encounter' was observed, using the video methods described below, was given the questionnaire detailed in Phase 1. The researcher took these results to analyse, making the adjustment from self-completion questionnaire to semi-structured survey interview. During this time, the research lost contact with the staff member at Chester Zoo. The staff member stopped returning the researcher's calls and emails. After several weeks the researcher was told the staff member had left Chester Zoo.

As participation from Chester Zoo dwindled, ZSL London Zoo contacted the researcher to express interest in having their “meet the animal” participants participate in the research study. Similarly to Chester Zoo, “meet the animal” experience had to be purchased and scheduled in advance of the programme. The Zoo also held the personal details of each participant. To avoid the ethical issues of obtaining participant details that were encountered at Chester Zoo, the researcher held a meeting with London Zoo staff to discuss participant access issues. The process was agreed upon, and approved by the ZSL IRB, that participants would be able to be contacted using their provided details. As “meet the animal” experiences were held everyday of the week, at the same time, it was simple to randomly select days for research, using a random number sequence. 10 days were randomly selected from the schedule for investigation, from those ten days two participants were to be randomly selected using a random number generator.

At this stage, a member of the visitor services staff notified the research, that indeed, she would not be able to provide the researcher with the participants’ details due to confidentiality issues. Instead, the research would be able to randomly select days to meet potential participants at the gates of London Zoo and seek their participation in the study. The researcher agreed to this methodology and set forth in conducting the research. After 5 days of futile attempts at meeting potential participants at the gates of ZSL London Zoo, it was realized that this method would result in the research project potentially not receiving participants and exceeding its budget. Therefore, the final method of participant sampling was

agreed upon with ZSL London Zoo staff, in which the researcher purchased discounted tickets for the "meet a penguin" programme and filled those spots using the participant sampling method outlined below (section 2.5.1). The process took approximately 8 months, from IRB approval to the start of the primary study.

2.5. Primary Study

2.5.1. Participants

This study analysed the interactions between human participants and non-human animals (penguins). Participants were derived from convenience sampling (Table 1).

Table 1: Participant Details

Participant	Attended with:	Age	Education Level	Gender
Cameron	Ilona	26	PhD	Male
Ilona	Cameron	25	PhD	Female
Chelsea	Diane	18	Bachelor	Female
Diane	Chelsea	20	Bachelor	Female
Megan	Elizabeth	15	GCSE	Female
Elizabeth	Megan	15	GCSE	Female
Charlie	Susan	22	Diploma	Female
Susan	Charlie	20	Bachelor	Female
Sandra	Candice	19	Bachelor	Female
Candice	Sandra	23	Bachelor	Female

Convenience sampling was chosen to gather the robust data from encounter participants that were otherwise not possible using the aforementioned probability sampling techniques, which required more formal access to the registered animal-encounter participant databases. Therefore, the sample recruited

and examined for this study may not reflect the current demographic variables consistent with the London Zoo visitor population or the vital statistics associated with persons who encounter penguins due to the use of convenience sampling.

Participants for this study were gathered using advertisements on social media. Advertisements were posted through Facebook on the ZSL London Zoo page, posted on the University of Warwick page and posted to a number of animal related pages. Participants were requested to volunteer in pairs. Participants volunteered to participate through email, indicating their availability to participate.

2.5.2. Field Sites

This research study was conducted at one primary facility and one secondary facility within the United Kingdom, each offering encounter experiences with penguins to the general public. The sites were chosen for their involvement in ex-situ conservation research and in-situ visitor studies, as well as their internationally recognised status as reputable zoos. ZSL London Zoo served as the primary facility for this research, whilst Chester Zoo was the secondary facility, having only participated in the exploratory phase.

2.5.2.1. Chester Zoo

Chester Zoo is a large zoological facility on the fridges of Chester in the North West of the United Kingdom. The zoo is accredited by the British and Irish Zoological Society (BIAZA). Chester Zoo is located on 111 acres, with a total land holding of approximately 500 acres (Chester Zoo, 2014). George Mottershead

opened the zoo in 1931; his mission in doing so was to create 'a zoo without bars' (Chester Zoo, 2014, 'About Us'). There was an admission charge of £20 for adults and £16 for children (age 3 -15) to enter the zoo, yet anyone was able to view the elephants free of charge, when Chester Zoo is open, from the Diamond Jubilee Quarter. Chester Zoo holds 11,000 animals, from 400 different species (Chester Zoo, 2014). Half of the species held are on the ICUN threatened species list, with nearly a dozen species listed as 'critically endangered' (Chester Zoo, 2014).

Chester Zoo offered their first animal encounters with penguins in 2012. At the time of this research publication, Chester Zoo had increased their animal interaction experiences to include encounters with Asian elephants, meerkats, Rothschild giraffes, lemurs and fruit bats. Each encounter was priced between £65-£89 per person depending upon the activities and programmes' length.

Penguin encounters offered guests the opportunity to interact with the Zoo's resident colony of Humboldt penguins, primarily through feeding. Approximately 50 Humboldt penguins lived at Chester Zoo during the research study. The penguins lived in an enclosure of approximately 540 m^2 (See image in Appendix A). The enclosure was designed to mimic an island, with a large naturally designed rocky beach and pool. The enclosure was rectangular, with the southwestern corner rounded. The indoor enclosures and kitchen building were located on the northeastern of the island. The island, itself, is large square grassy, sloped berm between, with rocky burrows along the North and East sides for penguin pairs to inhabit. A rocky beach bordered the South and West edges of the

'island', constructed of natural-looking sculpted, flat rocks, stacked along the edge of the water-island boarder, and was used by the penguins to sunbath. The pool was approximately 2,000 m^3, formed in a bean shape along the southwestern corner of the enclosure. The Western wall of which was an underwater viewing area, with a transparent panel separating the viewing public and swimming penguins. The height of the viewing window was 210 cm above floor level, ensuring the majority of visitors could see the penguins' underwater habitat, but could still view the island habitat.

The fee to attend the Penguin Encounter was £89 per person. To participate in the Penguin Encounter guests needed to be over the age of 5 years old. Children between the ages of 5 and 15 were required to be accompanied by a parent or guardian (Chester Zoo, 2014). The accompanying parent or guardian was required to purchase an entry ticket to the zoo, but was not required to purchase a ticket to participate in the Penguin Encounter. Parents or guardians were required to accompany their child on all aspects of the Penguin Encounter, but were not allowed to participate in any of the encounter activities. Up to 2 visitors were able to participate in the same encounter, not including accompanying guardians.

Penguin encounters occurred on specially selected days throughout the week, generally coinciding with the lead penguin experience encounter staff member's schedule. Encounters took place during the penguins' afternoon feeding. For those participating in the Penguin Encounter, they would initially meet the staff member, who would guide them through the encounter, at the Visitor Services

Kiosk (See Chester Zoo Map in Appendix A). Participants would receive an introductory briefing in at the meeting point. Following this introductory briefing, participants would be led to the kitchen area. The kitchen building consisted of a small cabin, where participants dressed in overalls for the experience encounters, which were worn over the participants' clothes, and wellington boots. Participants were also issued disposable gloves to handle the fish for feeding. Whilst getting dressed, the staff member used the opportunity to get to know the participants, by asking a variety of informal questions of the participants.

Once the participants were dressed, the member of staff led the participants from the cabin to the penguin enclosure kitchen. A primary component of the animal encounter was feeding the penguins. As such, participants were led through the preparation of the penguins' diet, including sorting a variety of fish. During this process the participants and keepers discussed the penguins, including the keepers discussing the conservation status of the penguins and participants asking questions of the keepers. Once the feeds were prepared, participants were led out onto the rocks bordering the pool to feed the penguins. Feeding lasts approximately 15 minutes. Whilst the feeding occurred, a member of the education team would deliver an educational talk on the penguins, including the conservation status of the penguins. Participants were not allowed, under any circumstance, to touch a penguin and must remain standing at all times. Once all the fish were fed to the penguins, participants were led back out of the enclosure and to the cabin to change back out of their clothing and then taken to their starting point at the visitor

centre. At the conclusion of their visit, participants are presented with a drink, small gift and participation certificate.

2.5.2.2. ZSL London Zoo

ZSL London Zoo is the world's oldest scientific zoo (ZSL London Zoo, 2014). The zoo was originally open in 1828, as a site for scientific study (ZSL London Zoo, 2014). In 1847, the zoo was opened to the public. ZSL London Zoo was based in Regent's Park in London, UK, on the boundary line between the City of Westminster and Camden. The zoo was accredited by the British and Irish Zoological Society (BIAZA). ZSL London Zoo was located on 36 acres, within Regents Park, which has a total land holding of approximately 400 acres (ZSL London Zoo, 2014).

ZSL London Zoo was home to the largest animal population in the United Kingdom. ZSL London Zoo was home to more than 19,178 animals, from over 800 different species. At the point of this research, London Zoo offered animal encounters with penguins and giraffes, whereas by the end of 2014 the Zoo offered encounters with penguins, meerkats, aardvarks, giraffes, kangaroos, owls, rainforest species and lions.

Each encounter was priced between £45-£90 per person depending upon the activities and program lengths, for example, the lion encounter cost £90, whilst the owl encounter cost £45 for members. In addition to the experience encounter charge, there was an admission charge of £23.63 for adults and £16.83 for children (age 3 - 15) to enter the zoo.

'Penguin Beach', replaced ZSL's historical penguin pool, creating a more naturalistic environment for the resident penguin population. The enclosure opened 26th May, 2011, as part of a £2 million-pound redevelopment of the Zoo's Barclay Court (ZSL London Zoo, 2011). The new enclosure was designed to allow for up to 150 penguins to live within the enclosure, quadrupling the size of the previous penguin pool. At the time of the research study, 47 Humboldt penguins and one Northern Rockhopper penguin lived at ZSL London Zoo. Penguin Beach was approximately 2,500 m^2 (Appendix B). The enclosure's largest feature was its massive pool. The pool, a large oblong shape, was the largest in the United Kingdom, at 1,207m^2 and holding 450,000 litres of water. The pool forms the Western and Southern borders of the enclosure, with an underwater viewing area running the entire border of each section. The narrow North side and wide Eastern side of the enclosure was bordered by a grassy, slightly sloped berm between, with rocky burrows along sides for penguin pairs to inhabit. The Eastern side of the enclosure had substantively more dirt and pebbles for the penguins to dig in. To the East of the arena, a large deck and replica base camp field station construct the lower portion of the Eastern border of the penguin pool. The deck provided visitors the opportunity to view the penguins swimming from above. The field station consisted of a number of interactive displays, where visitors could see the research resident ZSL penguinologists conducted in Antarctica (ZSL London Zoo, 2011). Behind the field station, there was one smaller pool to raise penguin chicks. On the North side of the deck, a double-gated entrance led into the penguin enclosure. The gates led directly into the Penguin Encounter area. The area, bordered by carefully

placed rocks, was approximately 35 m^2. The position of the rocks allowed penguins to enter and leave the encounter area freely. On the opposite, west side of the large penguin pool was a rock stage, where educational staff would deliver penguin talks and penguins could sun themselves. Due to the design of the enclosure, other visitors accompanying Penguin Encounter participants were unable to view the encounter.

The fee to attend the Penguin Encounter was £45 per person on weekdays and £60 per person on weekends. To participate in the Penguin Encounter guests needed to be over the age of 8 years old. Children between the ages of 8 and 15 were required to be accompanied by a parent or guardian. The accompanying parent or guardian was equally required to purchase a ticket to participate in the Penguin Encounter. Parents or guardians were required to accompany their child on all aspects of the Penguin Encounter. No more than 2 minors were allowed to participate in the encounter. Up to 6 visitors were able to participate in the same encounter.

Penguin encounters occurred everyday throughout the week, and were often sold-out weeks in advance of the encounters. Unlike, the Chester Zoo Penguin Encounter, the ZSL London Zoo encounters did not involve participants feeding the penguins. Encounters actually took place immediately following the penguins' afternoon feeding. Thirty minutes prior to the experience encounter, an educational talk and penguin feeding occurs at the penguin enclosure. When participants purchase tickets to the Penguin Encounter, they are told the penguin

talk occurs at this time. During the educational talk, the educator generally discussed the behaviour of the penguins and their conservation status, whilst 2 or 3 penguin keepers fed the penguins and encouraged the penguins to exercise in the whole pool (See Appendix B).

Following the end of the education talk, all participating members in the Penguin Encounters gathered at the field station, near a sign marked 'Meet the Penguins'. Participants would meet one of the penguin staff keepers who would guide them through the encounter. At this point, participants would handover their experience tickets to the keeper. Participants would then receive a short introductory briefing at the meeting point. During the briefing, participants were instructed to not restrain the penguins nor were they to disturb the penguin nests. Following this introductory briefing they would be lead into the enclosure.

Participants were not required to wear special clothing for the experience, apart from close-toed shoes, which were not supplied by the Zoo. Participants were allowed to bring cameras and personal bags into the enclosure, but were instructed to keep items away from the penguins reach. The primary component of the ZSL London Zoo Penguin Encounters was the opportunity to physically interact with the penguins. However, ZSL London Zoo makes no guarantees that the penguins will choose to participate in the encounters. During the encounters the participants and keepers discussed the penguins, including the keepers discussing the conservation status of the penguins and participants asking questions of the keepers. Generally, one to four penguins would enter the encounter space. The encounters lasted

approximately 30 minutes, during which participants were encouraged to ask questions and take photos of the penguins. At the conclusion of their visit, participants are led out of the enclosure, through a hand-washing facility. No gifts or souvenirs were presented to participants.

2.5.3. Semi-structured Survey Interviews

This section details the methods used to collect qualitative data from research participants. The semi-structured interviews consisted of a series of Likert-scales, with follow-up open-ended questions developed into an interview guide designed to elicit each participant's individual attitudes and experiences of human-animal interactions. This process was repeated following the Penguin Encounter. Each interview was taped and then transcribed following the interview. Prior to the interview, each participant was asked to sign and date a consent form and to complete a researcher-developed demographic profile.

2.5.3.1. Survey Interview Methodology

One of the fundamental data collection tools for this study was to be self-administered questionnaires designed to collect participant's attitudes and thoughts on a number of aspects regarding human-animal interactions. The questionnaires were derived from previous studies in human-animal relationships and visitor studies (Jensen, 2012; Kidd & Kidd, 1996; Reade & Waran, 1996). However, following the exploratory study (2.4.2) it was apparent self-administered questionnaires were not an appropriate method for gathering the qualitative

participant attitudes needed to construct this study. Questionnaires do serve as a tool to provide evidence of patterns amongst populations, the and have been used to positively demonstrate the attitudes of vistors towards animals and the impacts of educational programmes (Jensen, 2011), they fail in their ability to capture the thorough details of the individuals' attitudes and experiences needed for this study.

During the exploratory phase (2.4.2), the shortcomings in the questionnaire became apparent. Responses to the Likert Scales, intended to measure in-depth participant attitudes and reasoning, were superficial. Given the methodological necessities of TEM, more in-depth answers were required. The questionnaires were transformed into semi-structured survey interviews, as this form interview gathers in-depth information on participant attitudes, thoughts and experiences (Kendall, 2008). Indeed, interviews have an advantage over self-administered questionnaires to monitor participant's involvement with the survey questions, as well the interviewer has the ability to clarify concepts and engage deeper with the participant's responses (Dijkstra and Van der Zouwen, 1982). This approach is unique to studies of human-animal interactions, as it offers both quantifiable attitude data and in-depth rational of such responses.

The measures used in this study were derived from Mueller's study on the types of human-animal interactions (2014). Mueller measured children's emotion and cognition regarding animals (namely pets) on three domains: emotional attachment to an animal, cognitive representations and feelings regarding commitment to animals and moral orientation towards animals. These three

domains were used as the foundation on which questions for this study were derived. The unique property of this study is that it used these measures to not only compare to previous studies in HAI, but also that measures were collected prior to the encounter and after, enabling comparison of the individual's measures over time.

Participants were first asked if they could explain the relationship between themselves and the person with whom they were attending the encounter. This question was asked to establish the social relationship between the participants. Next, participants were asked several open-ended, descriptive questions regarding the nature and type of their animal-related experiences. Participants were asked if they currently had any pets or if they had daily interactions with animals and, if so, with what species of animals they interacted. Participants were then asked if they had ever interacted with animals in a zoo or captive environment and, if so, with what species of animals they had interacted. To take into account how participants envision penguins, they were asked to describe what came to mind when they thought of penguins. Finally, a set of demographic questions where asked, which included education level, gender, age and postcode.

The second set of questions probed participants' expectations of the Penguin Encounter. Understanding how participants' personal orientation towards their visit provided a starting point by which to understand participants overall experience. These questions included asking participants what they thought they would be doing the day of the encounter.

To measure the participants' emotional attachment, commitment to, moral orientation towards and anthropomorphic view of penguins, participants were presented with a physical questionnaire on which to rate their agreement with twelve statements. Participants were asked to rate their agreement on a 9-point scale ranging from "strongly agree" to "strongly disagree" (with an "unsure" response option for those who either preferred to give an opinion or did not hold an opinion).

Emotional attachment to was assessed using three items adapted from the Lexington Attachment to Pets Scale (Johnson et al., 1992; Also in Mueller, 2014). The three items were adapted to relate to the potential attachment and/or ownership of a penguin. One of these questions asked participants if they believed 'a penguin could make a good companion'.

Commitment: Commitment to the penguins was assessed using four items. These items were adapted to relate to the commitments of individuals to penguins in a captive and/or domestic environment. An example for these lines of questions included asking participants if penguins needed to be cared for by people.

Moral Orientation: Moral orientation toward animals was assessed using three questions adapted from the Lexington Attachment to Pets Scale (Johnson et al., 1992; Also in Mueller, 2014). These questions indexed participants' attitudes in relation to animal welfare concerns, including the treatment and captivity of

penguins in zoos. Participants rated statements such as, “If I were hungry, it would be okay to eat a penguin” and “Penguins deserve as much respect as people.”

Anthropomorphic Disposition: Participants’ anthropomorphic dispositions were assessed using 3 questions, which capture participants’ application of anthropomorphic emotions and thoughts on penguins’ ability to hold such emotions. Participants rated their agreement with the statements, “It is not possible to tell if a penguin is angry”, “Penguins have unique personalities” and “The penguins at the zoo are happy”.

In the follow-up to the Penguin Encounter, four, open-ended questions were asked of participants, reflecting on their self-perceived change interest and perception of penguins from each of the four standpoints. These questions included asking participants if they felt they had changed their thinking regarding penguins (potential) feelings.

2.5.3.2. Analysis

Interviews and audio from video footage (outlined below, 2.5.5) were transcribed and coded using an open-coding, grounded discourse theory approach. Each video/audio recording was transcribed in its entirety. Non-verbal gestures were described in the transcripts when relevant to the context of this research. Open coding is the first method is creating categories for understanding and deciphering qualitative data. In open coding, the transcripts are first examined to identify points and patterns, which are significant to describing the research

question (Strauss and Corbin, 1998). These points and patterns are categorised then clustered into related groups to determine the central phenomenon, the key pattern assists in explaining all other patterns (Creswell, 2007; Goulding, 2002; Strauss and Corbin, 1998). The categories that were previously identified and coded are then reorganised around the central phenomenon and recoded. This process is described as axial coding (Strauss and Corbin, 1998).

The identified coded categories were then synthesized as a theory developed, producing the axial coding model. An axial coding model describes how categories relate to and surround the central phenomenon. The final step was in the analysis was then to develop the selective coding, which describes the potential interrelationship between the categories, and apply these findings to the individual's trajectories.

2.5.4. Drawings

The predominate methods used in this research were observation and interviews, drawings were added to the mixed-methods design to illicit unconscious sentiments held by participants regarding human-animal interaction. Drawings served as a primary source of understanding how participants viewed the boundary between themselves and the animal, studying the unconscious thoughts of the participant, in a way that would have been impossible through linguistic methods, including qualitative Likert scales, which had primarily been used to understand the human-animal bond.

Social research has used visual methods to understand individuals' perceptions of their place in society for nearly 50 years. Predominately, studies using visual research methods in sociology have been placed in the minority, positioned behind narrative research and observation (Prosser, 1998). Visual methodologies originated in social science fields outside of sociology, predominately within anthropology and psychology. Anthropology invested in visual methods as a way of coming to know about foreign cultures. Anthropology first used photos and film to gather visual material on foreign cultures that would have not have otherwise been possible to gather from observation and interview alone (Long and Laughren 1993, Collier & Collier, 1986; Scherer, 1992). Not until the 1960's did sociology begin to use visual sociology as a legitimate form of data collection, collecting photographic evidence of racial tensions during fights for racial equalities (Hansberry, 1964; Davidson, 1970).

Early uses of visual sociology employed uses of images to create ways of knowing about other cultures, similar to that of the earlier anthropologists. Yet, the use of such methods was primarily anti-participatory, with the intent of using images in research as a means sustain the power of the researcher over the 'subject' (Literat, 2013). Participatory uses of visual sociology, in which the 'subject' is able to construct the image, came into use in the 1970's (Literat, 2013). Paulo Freire's study of Brazilian slum dweller's literacy was one of the most significant studies of this era (Freire, 1973). Freire asked participants to explain 'exploitation' through photographs. Interestingly, ideas of exploitation were understood in ways

that may have not otherwise been apparent to the researcher. Several researchers followed Freire's lead, asking their subjects to use digital tools, such as photography and video, to collect participatory visual data (Steng et al., 2004; Literat, 2013). Participatory drawings have been commonly less used amongst social researchers (Literat, 2013).

Historically, drawings have been used in psychological work with children and youth due to the method's suitability to elicit information from those without linguistic proficiency. Indeed, early researchers within psychology found children were able to share their inner thoughts and feelings through drawings, in a way not possible through linguistic methods (Buck, 1948; Machover, 1949). In his early studies, Buck developed a mixed-methods research protocol, combining drawings and questionnaires, in which young children were asked to draw a house, tree and person (HTP) (Buck, 1948; Buck, 1966). Buck argued this method of asking children to participate in HTP drawings, lead to a greater understanding of children's conscience and unconscious thoughts by studying the symbols within the drawings. Distinctly, Buck used the HTP drawings to gather information on the child's experience within their home and feeling regarding the environment. Ultimately, these drawings were used to understand the child's psych, and were used to a much lesser extent to understand the social experiences of the child. For instance, the trunk of the tree was representative of the child's ego, with heavy lines or shadings representing anxiety about one's self (Niolon, 2003). The validity of such drawing tests has been called into question by many academic researchers.

Wetton and McWhirter employed drawings in their use of the of a “draw and write” strategy to elicit children’s knowledge of health and health services (Wetton & McWhirter, 1998). In their studies, Wetton and McWhirter worked with children aged 7-8 years old to explore children’s ability to construct their perceptions of dental health campaigns (Wetton & McWhirter, 1998). Drawings served as the primary tool to evaluate children’s emotional literacy – the ability to express feelings with specific feeling words (Hein, 1996)

Studies with children, using drawings as the primary method, have often included studies of the relationships of children, including friendships and relationships with animals. Indeed, one such study assessed the cohesion and distancing between youths and their friends using drawings (Bombi and Pinto, 1994). Cohesion examined the constitution and strengthening of the relation, whilst distancing was framed as the assertion of individual autonomy. Drawings were scored using a dual scale, evaluating the cohesive and distancing elements visible within the drawings. Bombi and Pinto found youth depicted their friendships among a continuum of both cohesion and distancing. For instance, male youth often portrayed interaction with their friends from a distance and representatively larger personal spaces (Bombi and Pinto, 1994).

As discussed above, the majority of studies using drawings, within visual sociology, have primarily been confined to studies of children and youth, with few studies involving the study of adults. One of the first studies expanding the use of drawings, with adults, was conducted by Guillemin (2004). Guillemin uses drawings

to explore how adult health patients understand their illnesses. Guillemin argues the use of drawings as a research tool is underutalised by sociologists; as the confined use of drawings with children and youth is “not immediately obvious” (Guillemin, 2004, pg. 274). Indeed, the use of drawings exclusively with children seems to be grounded in the assumption children are unable to articulate complex attitudes or emotions (James, 2007; Lewis, 2010; Thomson, 2008). Simultaneously, this assumption indicates drawings are inappropriate for adults, as adults possess the linguistic tools necessary to convey complex emotions and attitudes. Regardless of this assumption, Guillemin suggests the use of drawings, as a research method is a useful tool to gather

2.5.4.1. Method

Using the research theories and studies identified above, this study of human-animal relationships employed drawings as a primary tool to identify the unconscious patterns of thoughts and beliefs regarding penguins, as well as general ways of relating to the penguin. Participants completed two surveys, one during the pre-test and one during the post-test. Drawings were done whilst the participants were being interviewed. Participants were provided with an A4 (29.7 cm x 21 cm) sheet of plain, unlined white paper, a pencil and access to a packet of 12 coloured pencils. Participants were asked to draw themselves and a penguin, no other directions were provided to the participant. The respondents, stating their inability to draw, generally met with requests a bit of hesitation, to which they were reassured drawings were not going to be judged on their artistic quality.

Participants often took a few minutes to begin their drawings, often attempting to be reassured by their co-visitor; however, individuals were not allowed to share drawings with each other during this period. Drawings were completed during each interview stage, giving them approximately 45 minutes to complete their drawings. All participants drew themselves and a penguin, however, to varying degrees of self-representation with a few participants only drawing a fragment of themselves, such as a hand, whilst other drew themselves in great detail.

Few respondents chose to include colour in their drawings, instead choosing to create monochromatic images. This choice may have been due in part to the colour of the subject, as penguins are primarily black and white animals. Most participants chose to draw their penguins in moderate detail, whilst a few were unsure of their ability to draw and chose to draw their penguins in a cartoon-like fashion, with little detail. Upon completion of the drawing, participants were asked to label the 'important' elements of the drawing. Drawings were collected from participants, labelled as either pre-test or post-test and stored electronically for comparative analysis.

2.5.4.2. Variables Derived from Penguin Drawings

Resulting from the studies discussed above, drawings resulting from this study were inductively coded along a four-dimensional construct, analysing the degree of cohesion, distancing, emotion and realism present in the drawings. The instrument in this study resulted from aspects of coding tools presented in children's relationship studies (Bombi and Pinto, 1994; Smith, et al., 2005; Bombi,

Pinto, Cannoni, 2007). The instrument used for this research was primarily derived from the Pictorial Assessment of Interpersonal Relationship (PAIR) construct (Bombi, Pinto, Cannoni, 2007). PAIR is a psychological evaluation tool developed to code drawings of children's representations of their social relationships, including those relationships defined as being close (e.g. friends, family) and those relationships marked as having special features (e.g. different social status). Initially, this tool is comprised of six independent scales: cohesion, distancing, similarity, value, emotions and conflict (Bombi, Pinto, Cannoni, 2007). In this tool, cohesion and distancing are defined as how the relationship is illustrated in terms of interdependence and autonomy of the actors. Similarity evaluates the degree of resemblance between the two actors, whilst value is used to evaluate the variation between the two actors. Emotion is used as a category of the tool to measure the evident sediments displayed in the drawings. The final component of the tool consisted of evaluating the range conflict apparent between the actors in the drawing. Bombi, et al. states PAIR can be reliably applied to detect how children understand interpersonal relationships in general, how they discriminate between different categories of relationships and how they represent variations within the same relationship' (Bombi, Pinto, Cannoni, 2007, pg. 5-7).

In Smith et al.'s study of animal-perceptions, the construct used to analyse children's drawings of themselves and animals consisted of three elements: interactivity, affect and realism (2005). Smith et al. used the Self-Animal Perception (SAP) construct to measure the effect of an animal ambassadors programme.

Unlike the PAIR construct, the SAP construct evaluates children's drawings using a step-wise model, considering each of the multiple attributes of the drawings to be a necessary component of the relationships between the individual and animal. Attributes in this model are not independent of each other. In this study, the ideal of realism is one critical factor of analysis. Realism in this case concerns whether or not the animals and the context in the drawings were realistically portrayed. Drawings were then scored as a zero (i.e. essentially not marked) if the subject matter was unrealistic.

For this research, an adjusted PAIR scale was developed to detect how individuals conceptualise interspecies relationships, so called the *Pictorial Assessment of Interspecies Relationships* construct. The construct seeks to assess how human participants discriminate between the different levels of interaction and how they represent the variations in relationship between themselves and the animal. The research instrument is used to analyse and compare drawings of potential interspecies relationships, along 4 main scales (Cohesion, Distancing, Emotions and Realism). The scale rejects the typical psychological analysis of symbolic perspectives, as well as the use of drawings as communicative tools. Instead, the drawings are evaluated for their ability to elicit unconscious thoughts of participant's understanding of the social world and emotions attached to human-animal relationships. Additionally, the drawings are used to reveal the social phenomena of human-animal relationships. The four scales were each further subdivided into dichotomic subscales (see Table 2).

Table 2: Pictorial Assessment of Interspecies Relationship Construct

Scale of Cohesion	Scale of Distancing	Scale of Emotion	Scale of Realism
C1. LOOKING AT: One actor is looking at the other	D1. LOOKING AWAY: One actor actively avoids looking at the other	E1. NEUTRALITY: Do the actors show an absence of emotion?	R1. SHARED ACCURATE PHENOTYPE: Do both of the actors resemble the expected appearance of the actor?
C2. MOVING TOWARDS: At least one actor reduces the space between the two actors.	D2. MOVING AWAY: Does the posture of one actor increase the space between the two actors?	E2. CONTENTMENT: Do the actors show a positive emotion?	R2. UNILATERAL ACCURATE PHENOTYPE: Does only one actor resemble the expected phenotype?
C4. JOINT ACTIVITY: Activity of one actor is coordinated with activity of second actor.	D3. INDEPENDENT ACTIVITY: Does one actor act by itself?	E3. HOSTILITY: Do the actors show hostile emotion?	R3. SHARED NEUTRAL PHENOTYPE: Neither actor resembles the expected phenotype.
C6. PROXIMITY: Actors are in close relation to each other.	D4. REMOTENESS: Are the actors placed far apart?	E4. DISCONTENT: Do the actors show negative emotion?	R4. REALISTIC ACTIVITY: Are the actors participating in a realistic shared activity?
C8. COMMON AREA: Actors are in the same, distinct region of space.	D5. INDIVIDUAL AREA: Is one actor set in an area of its own, distinct from the remaining space?	E5. OPPOSITE EMOTIONS: The two actors show contrasting emotions	R6. ACCESSORIES: Do the actors possess realistic accessories?
C10. UNION: Are the actors united by a graphic element?	D7. SEPARATION: Are the two actors separated by a graphic element?	E7. UNILATERAL EMOTIONS: Only one actor demonstrates emotion	R8. ENVIRONMENT: Are the actors portrayed in a realistic environment?
		E9. SHARED NEUTRALITY: Neither actor demonstrates	

	emotion
	E8. SHARED EMOTION: Each actor demonstrates the same emotion.

2.5.4.2.1. Cohesion.

Cohesion was measured if the act between the actors was considered convergent, in which one or both of the actors (participant and penguin) moved towards the other. Actions were measured on subscales C1, C2 and C3 (Looking At, Moving Towards, Joint Activity) are designed to evaluate the actions of the actors in relation to each other. While subscales C4, C5 and C6 (Proximity, Common Area and Union) capture the physical illustrations in which the two agents relationship is perceptually and/or metaphorically emphasized externally to the agents. Bombi and Pinto identified these three subscales as providing a visual representation of not only two actors in close contact with each other, but also giving a visual impression of the familiarity that is particular to intimate relationships (1994).

2.5.4.2.2. Distancing.

Illustrated actions were measured on subscales D1, D2 and D3 (Looking Away, Moving Away and Independent Action) to evaluate the distance portrayed between the actors. In these instances, either one or both of the actors are portrayed as directing their actions away from each other. Similarly, subscales D4,

D5 and D6 (Remoteness, Individual Space and Separation) capture the independence between the individual and the animal. The independence was judged on the separation between the two figures, either as space between the two actors or as physical barriers erected between the actors (e.g. a wall).

2.5.4.2.3. Emotion.

Assessing the representation of emotions was based on the Test of Emotion Comprehension (Pons & Harris, 2000). The Test of Emotion was based on nine components, organized into three levels of increasingly advanced emotional knowledge (Pons & Harris, 2000). The external level focused on the external aspects of emotion, such as situational causes to emotion, whilst the mental level explored mental aspect of emotion, such as understanding the impacts of desires and beliefs on emotional state. The highest level, the reflective state, focused on morality in understanding mixed emotions and how to regulate one's own emotional state.

Widely used as an assessment of understanding children's emotions, the tool was quickly adapted to understand children's illustrations of emotions (Bombi, Pinto, Cannoni, 2007). In subsequent work, Pinto and Bombi (2008) adapted the nine components of the Test of Emotion Comprehension to examine cultural influences in children's depictions of their friendships. The nine components were adapted, using a similar hierarchy of emotional depiction, into two subscales: individual emotion (E1, E2, E3 and E4) and emotional climate (E5, E6, E7 and E8).

Each subscale was further analysed for symbolic representations of emotion, using the PAIR manual as a guide for analysis (Bombi Pinto and Cannoni, 2007).

2.5.4.2.4. Realism.

The concern for realism in human-animal studies has focused on the 'need' to have humans and animals depicted realistically in realistic situations (Myers, Saunders and Garrett, 2004; Smith, Meehan Enfield and Castori, 2005). Indeed, the majority of evaluation stemming from environmental institutions has focused their efforts on creating education programmes to improve visitors' realistic portrayal of animals (Alerby, 2000; Ballantyne, Packer, Hughes and Dierking, 2007, Cainey, Bowker, Humphrey and Murray, 2012; Jensen, 2012). For Smith et al., the portrayal of realistic animals was one of the three absolute necessities to understand their participants' relationships with animals, if drawings failed to realistically portray animals, and the context in which the animals were perceived, analysis of the potential relationship ceased (Smith et al., 2005). For example, in Smith et al.'s study, one student depicted themself with a dancing frog. The drawing was determined to demonstrate an unrealistic situation and therefore not deemed to demonstrate the child's perception of their relationship to animals.

The assumption that unrealistic contexts and unrealistic animals did not represent a realistic perception of human-animal relationships was disregarded in this study. This study assumes unrealistic depictions of animals and contexts may represent the symbolic relationship, as similarly found in research of children's

interpersonal relationships. Under this assumption a scale of realism has been developed to analyse both the realism of the actors (R1, R2 and R3) as well as the realism of the context in which the actors are portrayed (R4, R5 and R6). The study of these dimensions provides further insight into the participants' perception of human-animal relationships.

2.5.4.3. Analysis of Variables.

The drawings were analysed using the three identified PAIR scales (cohesion, distancing and emotion) and the one adapted scale based on the SAP analysis, with the aid of the illustrated handbook containing detailed criteria for scoring (Bombi, Pinto, Cannoni, 2007). Cohesion and distancing were each made up of six subscales, scored dichotomously (0 = absence; 1 = presence of one or more pictorial indicators). The scale of emotion consisted of eight subscales of each of which is scored dichotomously. The final scale of realism consisted of five subscales to be analysed dichotomously.

2.5.5. Video Observation

Video recordings were chosen for gathering data from the animal encounters for its ability to analyse the dynamics of the human-animal interaction. Similarly to the drawings above, video provides a detailed analysis of interaction, which is impossible through any other means, including written observation (CITATION). Video observations were able to capture the context of the interactions, whilst also capturing the verbal and nonverbal cues of social

interactions. The approach used to gathering video data was taken from previous human-animal interaction studies (Burt, 2002; Lorimer, 2004; Lundin *et al.*, 2006). The approach to video observation was to be unobtrusive and exclusively observational. This method was chosen as a technique to make cross-comparisons between human-animal interaction studies, whilst also holistically observing the experience encounters. Using this method, this study was able to gather the instances of HAI, with penguins, in a captive, wildlife institutions.

Five Penguin Encounters were recorded with a hand held video camcorder. Each video recording lasted approximately 30 minutes. Video images were reviewed and analysed on NVivo 10. Each video clip was transcribed and notes made. During transcription, images of interest were transformed into text, which was analysed using the open-coding procedure described above (2.5.3). These results were triangulated with the results of the audio analysis to provide context for the HAI.

2.5.6. Document Analysis

In exchange for a smaller sample size and idiographic measures, this research does lose a degree of research objectivity and reliability, as well as broader generalizability. The purpose of the present study does not intend to generalize its findings beyond the Penguin Encounter at London Zoo, or relate to any other human-animal encounter at London Zoo. The sample may be illustrative of tendencies that recur in other zoo, and this can only be confirmed with reference to other studies.

Due to the investigative nature of this work in producing models of individual life trajectories arising from Penguin Encounters, retrospective accounts of the sociocultural influences needed to be accounted for in developing such models. Thus, at the first point of surveying participants a collection was made of identified sociocultural influences. Primarily, these influences included media sources. Therefore, given the need to establish a history for the small sample size used in this research a purposive sample was deemed an appropriate method to collect these sources. The media sources, including news media and films/television, acted as a significant feature of the historical sociocultural knowledge of participants. With this in mind, I collected information from a variety of data sources in order to analyse these foundations of participant wildlife knowledge. This included a number of sources, such as on site audio, interpretive displays, news stories and documents presented on ZSL websites.

This sampling technique allowed access to the very specific and narrow target set of media sources, which is one of the key strengths of purposive sampling (Neuman, 2009). The methods for purposively sampling data sources relevant for establishing the HSS of the penguin encounters were as follows. The BBC was sampled as participants, including viewing their news pieces online and watching nature documentaries online, mentioned it as a primary source of information. Indeed, the BBC is recognised as an influential media venue for wildlife information (Goatly, 2001). Data collection focused on articles reporting on ZSL London Zoo and themes arising from participant surveys/observations. Once the sources had been

found PDF files were created of the content and imported into NVivo for analysis. Data were analysed using the same methods of grounded discourse analysis discussed above.

2.6. Ethical Considerations

This research study had significant ethical concerns, as it investigated the interactions between humans and penguins, in a captive zoo environment. To mitigate ethical concerns of both human and non-human participants' approval for implementation of this study was obtained from the University of Warwick Institutional Review Board, ZSL London Zoo Institutional Review Board and Chester Zoo Institutional Review Board. Human study participants were recruited through online platforms through a detailed advertisement. The head of education research from each facility provided permission and support to contact (potential) participants. Permission to interact with the penguins and enter the penguin enclosure was given by the appropriate review board as well as the lead keeper at each facility. Each participant prior to participation signed an informed consent letter. The letter stated participation was voluntary and the participant was able withdraw at any time during the study. The participant signed a release from liability statement for each respective zoo, providing information of any potential risks engendered by this study, or the interaction itself. Potential benefits of participation in this study included insights into human-animal relationships and the role human-animal interactions in human attitudes towards nature. The participant was also made aware that his/her identity would remain confidential to

the extent allowed by law. Audio and video recordings, as well as participant drawings, are kept in a password protected digital file. No monetary compensation was offered for participation in the study. Videos of the participant's 'experience encounter' were provided following the close of the study.

Chapter 3. Experts in Science Communication

3.1. Introduction

Expertise is a sociocultural construct, shaped and altered over time. The chapter draws on Koppl's theory of the social construction of expertise (2010) to interpret the negotiation of Penguin Encounter's perception of ZSL's conservation expertise, including the interplay of media sources of information and expertise. Theoretically, science communication in informal learning environments provides a sphere to explore the validity of similar science expertise models discussed in other domains, such as the performance of expertise in the communication of science in media or public policy. Performances of expertise varied based on prior experiences and social interactions during the sessions. Drawing on the conceptual frameworks of participatory practices of expertise (Hajer, 2005), this chapter considers how the location of London Zoo's Penguin Beach facilitates public participation in conservation science by establishing ZSL as an institutional expert in penguin conservation. I argue the 'institutional expertise' of ZSL is mediated by the participants' prior face-to-face and mediated experiences with penguins.

3.1.1. Situating Expertise in Conservation Science

Conservation science is central to debates on environmental policy, climate science and a number of other human interests. The large number of institutions and individuals, across the world, who have taken up these debates, underlines the importance of this topic within society. Inside these debates, experts are often called upon to provide their knowledge to inform policy development, as well as to

inform publics. Public communication of conservation science is performed through a wide variety of dynamic media outputs and informal learning environments, which are continually addressed by a range of experts. Amongst these informal learning organisations are conservation institutions, such as accredited zoos (IUDZG/CBSG, 1993; WZO, 1995).

Significant to environmental science discourse is the role zoos serve as an authority in public spaces. Zoos, as self-described ambassadors for science, set a stage for publics to participate in scientific discourse. Indeed, the employees of zoos are often constructed as conservation experts to create social change and intervene in environmental conservation (Bowler, et. al., 2012). This research explores the social construction of scientific expertise in zoological institutions, as a setting for public participation in conservation science. Emergent research questions on the scientific expertise of zoological institutions include: On what basis is the Zoological Society of London constructed as a source for involvement, information and expert commentary on conservation science? How do the Zoological Society of London staff and participating publics perform and perceive scientific expertise? What discourses does the Zoological Society of London promote? How does the Zoological Society of London validate Penguin Encounter participants' expertise? Do publics believe one 'expert' over another? On what grounds do publics consider one more 'expert' over the other?

Practically, the study of the construction of expertise in science communication provides an exceptional opportunity for enhancing pro-

environmental behaviours through the use of 'close encounters'. This chapter draws on Berger & Luckmann's (1991) theory of the social construction of reality. I explore the construction of expertise through the lens of the institution, the facilitation style of the zookeeper and the interaction between the penguins and encounter participants. Through these three perspectives, how expert knowledge in conservation science are enacted, established and perceived is called into question. The findings of this chapter are interesting in light of growing concerns in conservation science. Research into what publics count as relevant scientific knowledge and whom they count as experts is vital to social change. Yet, prior research on expertise and the role it plays in science communication impacts is not clearly developed. The development of pro-environmental attitudes is muddled by a number of cultural experts. Thus, this section explores how those sociocultural sources of expertise influence individuals' participation in ZSL's environmental communication. The chapter begins by analysing zoos', including London Zoo, performance of expertise. Ultimately, this chapter explores how the use of human-animal interactions to advance conservation engagement, is influenced by notions of expertise in conservation science, which may support effective practice and instruction in conservation science communication.

3.2. The Rhetoric of Institutional Expertise in the Zoo Field

To understand how preconceived perceptions of conservation influence participation in the Penguin Encounters, one must understand how zoos came to be regarded as experts in conservation. As Berger and Luckmann stated (1991), "to

understand the state of the socially constructed universe at any given time, or its change over time, one must understand the social organization that permits the definers to do their defining" (p. 116). Yet, the development of how zoos have socially become regarded as institutions of expertise in conservation science is understudied. In studying the development of conservation education, it is essential to understand how the beliefs and actions of early conservation leaders led to the development of the current zoological state. To examine the ideal conservation state, put forth by zoological experts, the story must begin with the authoritative figure in zoo management.

In 1935, directors of 12 Western European zoological gardens formally initiated the construction of the World Association of Zoos and Aquariums (WAZA). These members were all scientists, and a member of the aristocracy. Theses members were perceived as having more knowledge on environmental issues than their visitors and thus were placed in a position of superiority in creating environmental policy. In 2000, the organisation was reconstructed to front a cooperative approach between regional zoological associations. WAZA describes zoological organisations as having particular expertise in conservation science. The following excerpt from the "Building a Future for Wildlife: The World Zoo and Aquarium Conservation Strategy" (2005) constructs zoos as having multiple forms of expertise in conservation science:

Extract 1

> Individual zoos and aquariums, and the zoo community, are pre-eminently suited to emphasize the global aspects of conservation.

> Scientific knowledge of the interconnections of all life systems and habitats has greatly increased in the last few years and it is becoming increasingly evident that conservation is not only a matter of saving species and habitats but, to be successful, also needs cooperation and a global approach. *Zoos and aquariums, because they care for, and have expertise in collections of living animals from around the world,* and because of their global network, can play a major role in promoting conservation cooperation on a global scale. (Emphasis added; WAZA, 2005, pp. 9)

Capitalising on this narrative, regional zoo and aquarium associations have incorporated a similar rhetoric within their manifestos. The European Association of Zoos and Aquariums (EAZA) have assimilated the expertise discourse into their 2014 European elections manifesto. The following extract amplifies EAZA's expert position in conservation science:

Extract 2

> EAZA wishes to further its engagements with the European Union as we believe that the *professional zoo and aquarium community has significant and targeted expertise* and opportunities to offer in many spheres such as the environment, conservation of species, engagement and learning, formal and informal education, tourism and social inclusion. (EAZA, 2014, Manifesto, pg. 2)

EAZA uses their self-constructed status as experts to positively frame their use of animals in animal encounters. The subsequent extract incorporates EAZA's position as conservation experts in delivering animal encounters:

Extract 3

> EAZA believes that the emotional power of an animal encounter is a major factor in persuading people to live sustainably, respectfully and altruistically. In an age where the values we need to promote to maintain our planet are under constant attack from materialism and the profit motive, meeting animals can reinforce our sense of belonging

> to a wider, more wonderful world; *these encounters remind us*, even in the face of constant advertising and information overload, that *a future populated by a wide diversity of animals and plants is more important than buying the latest smartphone*. (Emphasis Added; EAZA, 2014, Manifesto, pg. 6)

Together, the above extracts express a specific claim to knowledge and superiority in conservation science. A claim, which states zoos have expert knowledge of carrying-out and communicating conservation science issues. The tone of the extract indicates EAZA believes the human-animal interaction positively influences public appreciation of biodiversity.

This authoritative standpoint is supported by the UK government organisation DEFRA (The Department of Environmental, Food and Rural Affairs), who characterises zoos as having the responsibility of sharing their expertise with stakeholders in conservation:

> Additionally zoos can share their expertise to contribute further to conservation programmes. (Zoos Expert Committee Handbook, 2012, pp. 24)

DEFRA recommends zoos participate in education programming led by self-defined experts in related fields of zoology and conservation studies:

> Being an expert in their field, which could mean being a qualified aquarist, animal presenter or biologist, is an advantage. (Zoos Expert Committee Handbook, 2012, pp. 48)

In this excerpt, DEFRA validates the expertise of the zoo as a conservation society. As a prominent social figure, DEFRA's validation of the zoo's expertise

serves to facilitate the zoos practices, including those of environment management. As the oldest zoo in the world, and holding the largest range of species in the UK, this rhetoric also entrenches London Zoo in the social perception of who may be an expert is conservation science.

3.3. London Zoological Society as Conservation Expert

This section explores how organisations construct knowledge (Choo, 1996) of conservation science, and how that knowledge is then reflected within the practitioners and participants of that organisation. In this role, ZSL serves as sense-makers of conservation events, translating conservation science described by researchers to publics. The present data illustrates how ZSL used their knowledge of and participation in conservation, alongside social validation of ZSL's commitment to conservation science, to construct themselves as experts of science. My hypothesis is that in doing so, ZSL aimed to construct an expert identity in order to elicit publics to visit ZSL, for educational purposes, whilst also securing support from publics for ZSL's conservation research and other institutional goals. Indeed, the Zoological Society of London highlights their responsibility for hosting "conservation programmes in Britain and in over 50 countries worldwide" (ZSL, 2015, About ZSL Conservation).

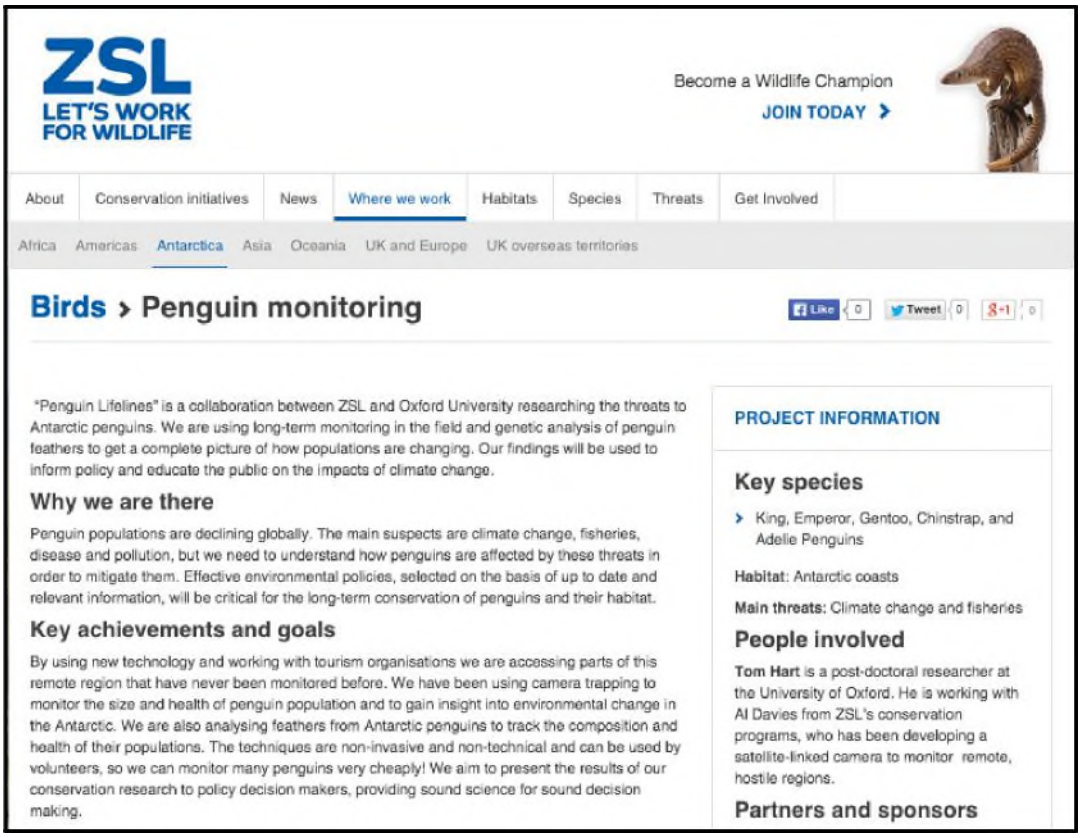
Extract 4: About ZSL Conservation

> For over 180 years the Zoological Society London has played an essential role in convening experts to address challenging science and conservation issues, including hosting high-profile public meetings, symposia and national and international workshops. Throughout the world we work with governments, civil society and the private sector to conserve species and habitats. We contribute to building conservation

> capacity and skills in the UK and abroad through educational programmes, workshops and Masters and PhD courses and awards to support young conservationists.

ZSL's intention to establish themselves as sense-makers, and in-turn experts, is explicitly evoked in the quotations presented above, where 'experts' are used to establish the basis of ZSL's work. ZSL draws on social discourses of environmental movements to directly set themselves apart from the negative biopolitical perceptions of zoos. In the passage, ZSL claims to 'work with local communities to conserve their environment and promote sustainability' defines ZSL as a community-based organisation to be trusted, and is strengthened by ZSL's worldwide work 'to conserve species and habitats'.

Figure 1: ZSL's penguin monitoring webpage



The presentation of their research with penguins is constructed as a collaborative endeavour between ZSL and a well-respected university, further strengthened by an 'expert scientist's' support. As outlined in Chapter 1, zoos' conservation activities are often called into question (Chrulew, 2011; Falk *et al.*, 2007; Zimmermann *et al.*, 2007; Rabb, 2004; Hutchins, Smith, and Allard, 2003; Mazur and Clark, 2001). The opposition to anti-zoo rhetoric is explicit on their Penguin monitoring research webpage. While anti-zoo movements attempt to nullify the legitimacy of the zoo conservation movement (e.g. Burt, 2005; Malamud, 1998; Berger, 1977), ZSL uses their research collaborations to build their legitimacy. It is this legitimacy that ultimately may lead publics to considered ZSL an institute of

science research. As I go on to discuss ZSL's establishment of expertise, their resident scientist supplements the reality of ZSL's presence in conservation research.

3.3.1. The Resident Scientist

Defending their work as a legitimate conservation science organisation, ZSL defines what both conservation research and zoos could and should be involved in by presenting an authentic penguin research scientist (penguinologist) as representative of their devotion to conservation research. A recognisable aspect of the Penguin Beach conservation messages was the placement of the resident penguinologist. The Zoological Society of London, in partnership with Oxford University, employs Dr Thomas Hart. Dr Tom primarily researches threats to the conservation of Antarctic penguins (Oxford University, 2015, Ocean Research and Conservation). If expertise can be defined as the "manifestation of skills and understanding resulting from the accumulation of a large body of knowledge" (Chi, 2006, pp. 167), Dr Hart would be considered an expert in the study of penguins. Dr Hart has conducted research on penguins for Oxford University and London Zoo for nearly 10 years. Dr Hart's qualifications are often featured in news articles regarding his work:

> Tom acquired his PhD in Biology from Imperial College and is part of the Department of Zoology at Oxford University. (Quark, 2015)

> Tom Hart, a junior research fellow in the Department of Zoology at the University of Oxford, is the man behind Penguin Lifelines -- a collaborative international project researching the threats faced by Antarctic penguins. (CNN, 2015)

By giving publicity to his credentials, media legitimises the work undertaken by Dr Hart through his knowledge. Indeed, it is media who positions Dr Hart as a key scientist in the research of penguins. In a BBC documentary following the work of Dr Hart and other penguinologists, research on the behaviours and plights of penguins featured on *Penguins - Spy in the Huddle,* aired February 2013, attracting more than 4.5 million visitors.

Figure 2: Dr Hart placing a spy camera in Antarctica

Penguins - Spy in the Huddle (PSH) presents the lives of several species of penguins, through 'spycams' strategically placed near penguin colonies. 'Spy' cameras documented nearly a year in the life of the penguins. Presented in a similar fashion to *March of the Penguins* (2005), PSH documents the PSH presents a

narrated humanised story of the life of the penguins. Presenting penguin research, and appeals for improved conservation practices, through individualised penguin stories.

This aspect of Dr Hart's research resonated with several of the participants' pre-visit media accounts of penguins. Indeed, Illona discussed the series at length. Her fascination with the film focused on her empathy for the penguins.

Extract 5

> Researcher: So, you've watched documentries before?
> Illona: Well, yeah. I watch documentries a lot. I guess I'm a bit of a nerd. We watched that penguin camera series earlier this year. I think it was about some research being conducted by Oxford. Maybe? Researcher: Oh yeah? What did you think of it?
> Illona: It was bit funny. They had a camera inside a fake penguin! And some of the penguins tried to be friends with it, which I guess was a bit sad. They just really wanted to be friends with it. It was interesting though. I didn't realise their were so many types of penguins. The poor little ones that kept falling off the rocks. He was sad.
> Researcher: That does sound sad. Was there anything else you...
> Illona: Oh! And the one that had died. The chick froze to death. The dad had to leave and the baby froze to death. The mum tried to warm him up, but he was already dead. It was just so sad.
> (Illona and Cameron, 02 September 2013, London Zoo, Before the Visit)

Not only do the participants frame the series using anthropomorphic terms, media also discuss the human characteristics present in the series:

Extract 6

> They are among Mother Nature's most devoted parents. From the moment Emperor penguins meet, they form a perfect, monogamous partnership to devotedly raise their chicks in the most inhospitable nursery on Earth. And, as these remarkable pictures show, penguins are

> surprisingly like us. From sexual jealousy, to grief and shared childcare, these endearing creatures show extraordinary empathy and understanding. The heartwarming scenes were filmed using pioneering spy-cams for the BBC's latest wildlife series, Penguins: Spy In The Huddle. (Daily Mail, 2013)

Extract 7

> Get the tissues ready, not all of the chicks survive tonight's Penguins: Spy in the Huddle. (Mirror, 2013)

Extract 8

> The Robotic Baby Penguin That Spies For Scientists (NPR, 2014)

In both the audience and media excerpts the penguins are framed as living almost human lives, mentioning their need for survival, partnerships and raising young. Even in though the narrative does not necessarily represent the true nature of the penguins' existence (Cameron, 2006), the story are finishes on a happy ending. The audience's emotive response combined with aspects of scientific rigour, work to strengthen Dr Hart's position as an expert with penguins.

Participants' view his research as a positive endeavour. As Freeman and Jarvis (2013) argue, framing nature stories is of consequence to conservation research: 'if people's media-cultivated value systems don't allow them to care, then all the information in the world won't matter' (p. 1). It is the emotive response to media that serves as the link to build meaning in Dr Hart's research.

Furthermore, Freeman and Jarvis state the meaning built from media bind Dr Hart's 'networks together in a way that is both imaginary and real (p. 2). One of the primary illustrations of this phenomenon is through Quark

publications. Beyond providing close-encounter experiences with animals in their natural environment, Quark sponsors a number of scientists, promoting their research through online media. Dr Hart features predominantly within a number of the organisation's features. Indeed, excerpts from Quark built a complete profile of Dr Hart, building a virtual community of penguin enthusiasts. In the excerpt below, Quark hosted an online question and answer session with Dr Hart:

Extract 9

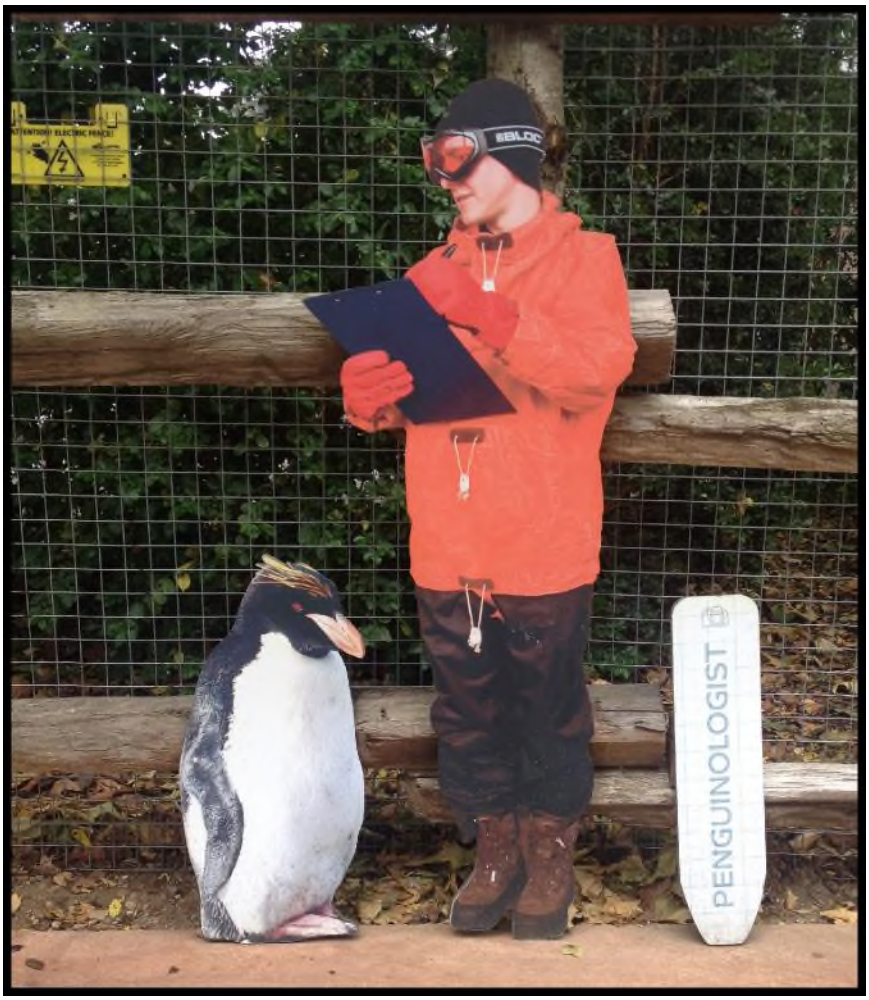
> We're setting up a live web chat with Dr. Hart this Thursday, June 13th at 12:00pm EST and you're the special guest. Got a burning penguin-related question that demands answering? Wonder how one becomes an expert in the field of penguinology? (Quark, 2013)

Participating in a dialogue session, as the one above, places Dr Hart at the forefront of the interface between publics and penguin conservation research. Web chat sessions give participants an opportunity to participate in an exclusive activity. Web chats are designed to be intimate conversations between the practitioners and interested publics. In this scenario, Quark employs Dr Hart's human capital to connect their members in their area of shared interest (Becker, 1993). Quark community participants, who engage in the web chat, reinforce and build trust in Dr Hart's research profile (Ardichvili, Page and Wentiling, 2003), contributing to his social capital (Chiu, Hsu and Wang, 2006). Together, Hart's human and social capital establishes him as a leading expert in the study of penguins (Chiu, Hsu and Wang, 2006; Mieg, 2006; Ardichvili, Page and Wentiling, 2003).

The connections between Dr Hart's experiences and his residency at ZSL increase opportunities for building his expertise, and opportunities to reinforce ZSL's position as conservation experts. One of his roles at ZSL has been the oversight of the development of Penguin Beach and to promote the research conducted with Antarctic penguins. In evoking Dr Hart's expertise in building Penguin Beach, ZSL emphasises Antarctic field research and zoos positions within cultural discourses of conservation. Although Dr Hart is not physically present at London Zoo, his presence is built into most of the Penguin Beach interpretation (Figure 3, Figure 4 and

Figure 5).

Figure 3: Life-size reproduction of Dr Hart at ZSL



In the figure above, Dr Hart is displayed in his Antarctic field research suit, with a figure of Ricky the Rockhopper, a species of South American and New Zealand penguin. Dr Hart's work is partially sponsored by ZSL and forms the basis for the entirety of Penguin Beach's interpretation.

Figure 4: View 1 of ZSL's penguin base camp

Figure 5: View 2 of ZSL's penguin base camp

The interpretation focuses on Dr Hart's work in Antarctica. The didactic panels feature photos of his work, whilst a television set played clips of his fieldwork expeditions. Each piece reinforces the legitimacy of ZSL's research in the field. Furthermore, Dr Hart has featured in short, interpretive films by ZSL describing his in-situ research in Antarctica.

Figure 6: Frame from Dr Hart's interpretive film

In these excerpts there is an emphasis on Hart's research and his connection to ZSL, which reinforces his expert status as part of the worldwide zoo conservation movement. ZSL positions Hart's expert status a significant contributor to conservation culture. Exploiting Hart's position as expert and ZSL fellow, ZSL legitimises their involvement in penguin research, including their own research ex-situ, whilst also asserting their own knowledge of conservation research.

3.3.2. The Role of Media and Online Communication

In the first part of this section, I outlined and analysed the self-construction of ZSL's expertise. Drawing on this context, this section discusses the news, films, television and social media, henceforth referred to as 'media', representation of ZSL. The media's representations of ZSL focus polarise aspects of ZSL's expertise in conservation and animal welfare. First, the majority of media's representations of ZSL are based on their perceptions of ZSL as a home for animals and participation in

scientific research. In contrast, media criticises ZSL for failure to care for the captive animal environment.

3.3.2.1. Framing ZSL as Conservation Saviour

Media may play a key role in communicating conservation issues, dominating several aspects of scientific knowledge production (Cook, 1998). In spite of this, research on the influence of the media on public's beliefs regarding zoos and conservation is underrepresented. Indeed, the advent of social media and digital mass media has meant conservation issues are receiving a higher public profile than ever before (Davies, 2001). Tracing the depiction of zoos and conservation in mass media is important to examine (a) how ZSL are framed and (b) how ZSL is incorporated into social perceptions of conservation and zoos.

Elite UK press organisations presented ZSL as the expert in penguin conservation science by presenting a narrative of ZSL as protagonists. This protagonist narrative was constructed within the larger environmental movement, which focuses on protecting the environment by employing ideals of sustainable management of resources and species conservation (Luo and Deng, 2008; Yearly 1996; Van Liere and Dunlap, 1980; McCormick, 1991). Yet, the role of zoos has generally received limited attention in the grand narrative of environmental debates.

One facet of the protagonist narrative was the introduction of expert knowledge in their research and animal husbandry. In the articles presented below, ZSL is presented as having specialist knowledge on the conservation of species:

Extract 10

> "The Zoological Society of London's penguin expert Tom Hart said of Penguin Beach: 'It's much bigger and deeper. Ones that like the beach or rocky shores have got their habitats. They look really happy.'" (Daily Mail, 27/05/2011)

Extract 11

> 'Sarah Camerontie, ZSL's tiger conservation expert says: "The Sundarbans is a critical tiger habitat; one of only a handful of remaining forests big enough to hold several hundred tigers. To lose the Sundarbans would be to move a step closer to the extinction of these majestic animals. [...] The recently established IUCN SSC Mangrove Specialist Group, hosted by ZSL, will develop a global conservation strategy for mangroves based on an assessment of research and conservation needs."' (Vidal, *The Guardian*, 2013)

Extract 12

> 'Determining why these rare turtles are arriving on UK shores can be very difficult unless a post-mortem is undertaken. "We carry out a standard series of observations and tests," says Mr Rob Deaville, a cetacean expert at the Zoological Society of London (ZSL). [...] The Cetacean Strandings Investigation Programme (CSIP), coordinated by ZSL and funded by Defra, has conducted 22 marine turtle post-mortems since 2001.' (Lever, *BBC*, 2008)

The narrative developed in the excerpts above exemplify ZSL as 'environmental protagonist', evolving from their employment of experts, exceptional animal husbandry skills and their investment in in-situ research, the climax of which is the saving of a species from the brink of extinction. ZSL's place in conservation science research is reinforced by media's emphasis on the need for

ZSL for the conservation of species, and in particular their ex-situ breeding

programmes in the UK. ZSL's work to breed endangered species was presented in the UK press as a critical endeavour in environmental conservation:

Extract 13

> 'London zoo launches campaign to save tigers in the wild. The Zoological Society London (ZSL) is hoping to raise £2m to build a conservation headquarters at its Regent's Park base in central London. The planned centre would combine a breeding facility and conservation hub where visitors could watch the tigers. The Tiger SOS appeal will also fund ZSL's work in Indonesia where up to 40 mainly local staff are working to save tigers in the community. ZSL's director David Field said having a breeding population in zoos was a lifeline for the tigers.' (BBC, 21/02/11)

Extract 14

> 'Meerkats and Mojitos . . . you'll have a wild time at the zoo. London Zoo's regeneration is a model of imaginative conservation.' (Pelling, 04/08/10, BBC Meerkat and Mojitos...)

The excerpts clearly place ZSL at the centre of animal conservation, 'having a breeding population in zoos was a lifeline for the tiger' (BBC, 21/02/11) and being 'a model of imaginative conservation' (Pelling, 04/08/10). Despite the need for the preservation of habitats as the primary need for the conservation of species, this article places ZSL at the forefront returning endangered species to their natural habitat (Hancocks, 2001). Indeed, one of the fundamental critiques of the protagonist narrative is zoos failure to focus on ex-situ conservation.

3.3.2.2. Critiques of ZSL in the News

The elite UK press and digital media often polarise the actions of ZSL in dramatic terms. Although positive stories are more frequently found in the press than negative stories, the headlines of negative stories were more dramatic.

Indeed, the elite public media have often broadcast critical debates of animal welfare and conservation, pinning 'expert' scientists against one another. The following extract demonstrates how the media perverts the protagonist narrative into a narrative of the anti-protagonist.

Extract 15

> If London Zoo really cared about animals, they would cancel their rowdy 'Zoo Lates' parties
>
> We should recognise these institutions for what they are: profitable prisons. The profound levels of stress, anxiety and agitation that wild animals experience in captivity mean attacks on people occur with staggering regularity. This week alone, a 16-month-old girl was scratched by a lion in a circus in France, a zookeeper was bitten by a tiger in Australia, a woman in the US lost a finger to a lion in a zoo and a boy had his hand ripped off by a tiger in a zoo in Brazil. All these attacks were preventable and utterly predictable. Captive animals are not permitted to engage in normal behaviour, such as running, jumping or hunting. Every facet of their lives is controlled, including when and what they eat, when they sleep and with whom they mate, so is it any wonder that they lash out in frustration? Patrons of what London Zoo actively promotes as "a wild night out" are there to party. Rowdy, drunk humans and captive wild animals make for an even more dangerous combination for all concerned. (Bekhechi, Independent, 2014)

Simply, this article begins by deconstructing the expertise of ZSL. ZSL is portrayed as lacking the core principles of the conservation movement, building in their disgust for ZSL's generation of funds from these activities:

Extract 16

> With tickets costing up to £35, the zoo claims that Zoo Lates bring in important revenue, generating £800,000 a year to fund its "conservation" work. But if the zoo were truly concerned about protecting animals, any event which posed even the slightest risk to the animals would be cancelled immediately. (*ibid*)

The excerpt above begins to frame ZSL's 'Zoo Lates' as a lucrative venture, one focusing on the financial gains for ZSL and not the welfare of the animals. The discourse builds on ZSL's concern for making money. The reporter in the excerpt below questions ZSL's commitment to conservation, specifically stating their belief that ZSL has disregard for ex-situ conservation needs:

Extract 17

> Zoos put the "con" in conservation. Why else would they be raising money to keep animals incarcerated as living exhibits instead of asking the public to donate to schemes that would protect them in their native habitats? When, in 2007, London Zoo spent £5.3m on a new gorilla enclosure, Ian Redmond, the chief consultant to the UN Great Apes Survival Partnership, said, "£5m pounds for three gorillas when national parks are seeing that number killed every day for want of some Land Rovers, trained men and anti-poaching patrols. It must be very frustrating for the warden of a national park to see". (Bekhechi, Independent, 2014)

After establishing this anti-conservation narrative of ZSL's misappropriation of funds for animal conservation, the animal-rights angle is used to substantiate their negligence claim.

Extract 18

> It's bad enough that the London Zoo's permanent residents have no way of escaping their day-to-day confinement, but to deliberately encourage and promote events which pose a threat to them defies belief. Everyone who genuinely cares about tigers and all the other individuals held captive inside zoos should recognise these institutions for what they are: profitable prisons that don't give a monkey's about the individuals in their "care". (Bekhechi, Independent, 04/08/14)

Following the introduction of the animal rights angle, the narrative moves to discourage publics from attending zoos.

Extract 19

> Once they realise what zoos are really like for the animals imprisoned in them, most people stay away. There are many genuinely rewarding ways to learn about wild animals, without snatching them from the wild, such as watching nature documentaries or becoming an expert about the wildlife in your local area.' (Bekhechi, Independent, 04/08/14)

Operating on the protagonist narrative, Bekhechi (2014) suggests individuals can serve as protagonists of nature, rather than give their resources to zoos, the anti-protagonists. Certainly, Bekhechi's arguments place ZSL at the centre of controversial environmental sociology. The negative discourse in the following press extract similarly protests the expertise of ZSL in caring for animal species.

Extract 20

> 'London Zoo criticised over death of baby gorilla Tiny. A leading evolutionary anthropologist has called London Zoo "incompetent" over the death of its baby gorilla in an attack by a silverback.' (BBC, 14/05/2011)

The distinctive patter of using other scientist quotes by these press organisations is deliberate in deconstructing ZSL as an expert conservation organisation. The use of other scientists' judgments within theses spaces opens up questions over the suitability of ZSL as a conservation organisation. Scientists framing of London Zoo as anti-protagonist varied amongst ZSL's press coverage. For

example, the following coverage in the Independent starkly contrasts to the Independent story above.

Extract 21

> Ian Redmond, a primatologist who acts as envoy for the UN Great Apes Survival Partnership, said that London Zoo contributed more to conservation in the wild than most zoos. "We should give credit where credit is due and ZSL as an organisation is funding in-situ conservation, but only a tiny proportion of its annual budget" he said.
>
> "The role of a captive collection is increasingly being brought into question and I hope the society will evolve and put more effort into field conservation rather than maintaining a collection for the entertainment of the people of London." (Independent, 16/10/10)

In this case, the scientist approves ZSL's contribution to conservation, whilst simultaneously condemning ZSL's disproportionate investment in in-situ research versus their investment in 'maintaining a collection [of animals] for the entertainment of the people of London' (Independent, 16/10/10). Often missing from these press stories is the presence of the zoo. To combat the spread and impact of anti-zoo rhetoric, and to develop public trust, within the online public sphere, ZSL developed a visible social media identity.

3.3.2.3. ZSL: Creating A Media Presence.

Social Media Presence. New avenues of public engagement and knowledge production have arisen from the public sphere, challenging the traditional roles of scientific knowledge production (Wagoner, Jensen and Oldmeadow, 2014; Birch, 2011; Jensen; 2011). London Zoo, having spent several decades building a reputation for environmental expertise, is being confronted by

the emergence of the new sites of knowledge production. Sites such as Twitter and Facebook allow polarised viewpoints to come into the public sphere. These sites of discussion open up a new realm for public engagement with science, alongside renewed interests in environmental issues. ZSL maintains twelve Twitter accounts, excluding staff accounts: ZSL London Zoo, ZSL Arts & Culture, ZSL Events, ZSL Science, ZSL, Edge of Existence, ZSLMarine, ZSL Whipsnade Zoo, ZSL Palm Oil, ZSL Kenya, ZSL Rio+20 and ZSL Conservation. ZSL makes use of their Twitter accounts to facilitate the exchange of knowledge between nearly 20,000 'followers' and their practitioners.

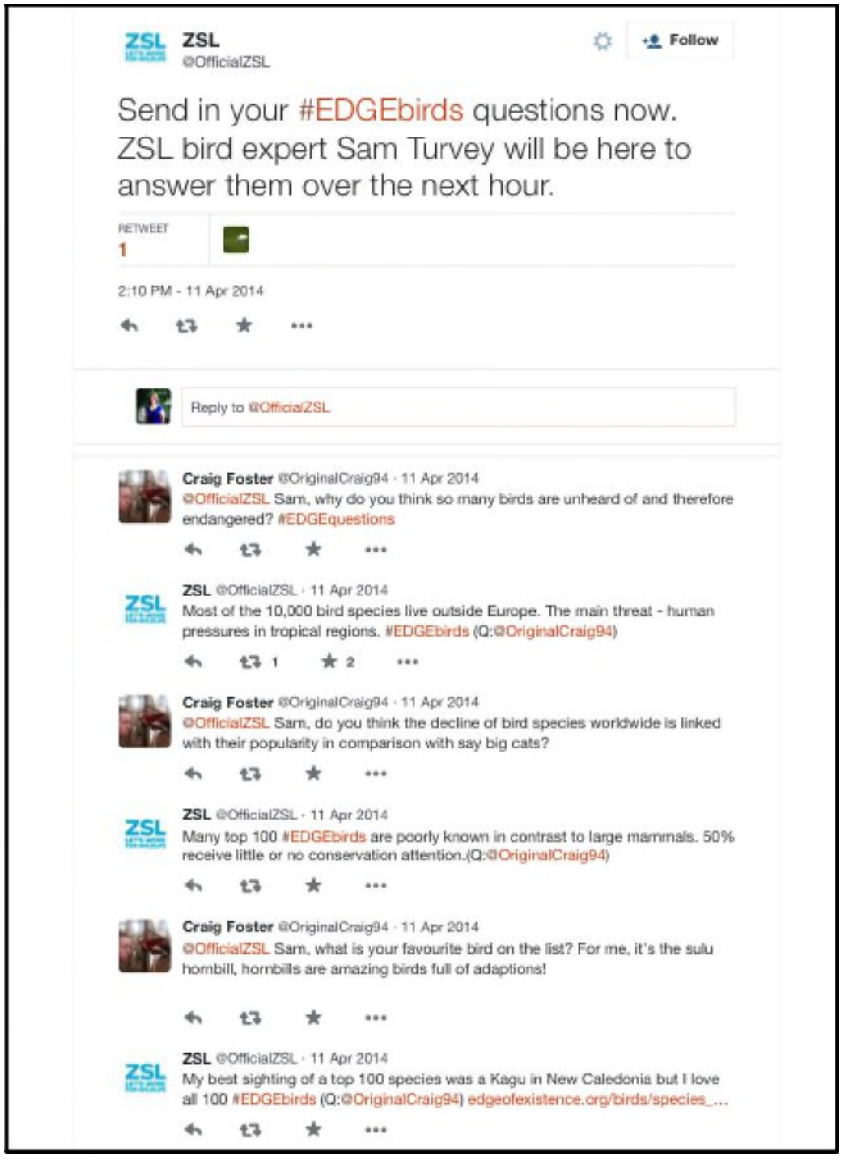
The Twitter profiles provide a dialogue space, allowing their 'followers' to discuss conservation issues with London Zoo. Each page sets the tone of the discussions; the @ZSLOfficial page is a general interest page. Tweets are meant to bring interest to ZSL topics, such as inspiring interest in a rare bird species. One way ZSL does this is by setting up sessions for the public to 'ask the expert' questions.

Figure 7: Examples of ZSL's expertise on Twitter

> zsllondonzoo 15 mins until @OfficialZSL's Twitter question & answer session with an okapi conservation expert. Send in your #okapi questions for 2pm GMT. (@ZSLLondonZoo, 28/11/13)
>
> OfficialZSL Our "Wildlife comeback in Europe" Q&A has now started, send in any questions to @LouiseMcRae and ZSL's expert will answer them for you. (@ZSLOfficial, 26/09/13)
>
> Keep your #EDGEbirds questions coming in for ZSL bird expert Sam Turvey, here for another half an hour. (@ZSLOfficial, 11/04/14)

The design of these communication sessions follows a model of first-order thinking (Irwin, 2001), placing the followers as seekers of knowledge and zoo scientists as experts, with privileged holders of scientific knowledge.

Figure 8: Extract from ZSL's Twitter #EDGEbirds Q&A session.



Conversations in these 'expert' sessions were predominantly used to provide knowledge to the public. In analysing the landscape of online expert-public discourse, its apparent sessions do attract a number of followers, but fail to create 91

a genuine relationship between the scientist and public follower. Instead, the sessions reinforce the privilege of scientific expert and uninformed lay public (Wynne 1991, 1996, 2003; Irwin and Michael 2003).

Television Presence. In 2010, ZSL collaborated with ITV to develop 'The Zoo', a reoccurring documentary of ex-situ work at ZSL, whilst also furthering the human involvement at ZSL. 3.4 million viewers tuned into the first season (ITV, 2010). ZSL positions the documentary as a 'three-part factual series for ITV giv[ing] viewers exclusive and compelling behind-the-scenes access to the lives of the animals and staff at ZSL London Zoo' (ITV, 2010). Positioning ZSL as a conservation organisation, the series evokes the viewer's empathy for the animals, focusing on the significance of ZSL's work in the environmental movement. As Winston argues 'documentary more than any other filmic form produces nature as a guarantee of truth' (1993, p. 55). ITV's portrayal of ZSL in 'The Zoo' suggests the nature encountered is 'the truth', placing them at the forefront of British environmental discourses and convincing viewers ZSL are experts in conservation research.

3.3.3. Constructing the Expert Zoo Keeper

Central to ZSL construction of its expertise is the zookeeper. The central figure to the Penguin Encounters is the zookeeper. In these encounters, 'the expert' zookeeper plays an important role. Each keeper worked primarily with the birds. Given the previously mentioned definition of expertise, many keepers would fail to meet the criteria. Yet, by commodifying the human-penguin interaction into a

product, ZSL effectively is selling the expertise of their keepers, who run the programme.

One facet of the encounter is the online pre-encounter interpretation. Penguin encounter participants usually purchase their tickets online. ZSL frames the consumption of the Penguin Encounter as a site for gaining access to and situating the Penguin Encounter in participating in expert culture.

Extract 22

> 'An *expert* Keeper will be on hand to answer any questions you have about these amazing animals, find out if all penguins live in cold climates, what makes them a unique bird and how fast they can swim' (Meet the Penguins, 2014).

The extract above demonstrates the institution's construction of the zookeeper as the 'expert'. It is the institution that has deemed the zookeeper to be the source of knowledge on all aspects of the penguins' nature, using the personal expert conversation as the attraction for purchasing the encounter.

3.3.3.1. Insider and Outsiders

Zoos ultimately hold nature as captive. The majority of animal species held at ZSL are easily viewable in their natural environment for the typical visitor. Yet, with the advent of social media and the ease of traveling, zoos face competition for public investments, as publics are able to visit natural environments and/or view species online. To encourage prolonged investments in ZSL's conservation programmes, ZSL has sought to setup programmes placing experts and publics in

the same sphere, designed to encourage deeper dialogue between the two parties. Yet, this data illustrate encounters are deepening the divide between the experts and lay public. As Berger and Luckmann discuss, the role of science communication is to bridge the social divide between the so-called scientific expert insiders and the lay public outsiders. They argue programmes, such as Meet the Penguins, are intentionally designed so 'the outsiders have to be *kept out* and the insiders have to be *kept in*" (1961, p. 87).

One of the shared facets of participants' demographic background was their lack of formal conservation education. All of the participants, apart from the 2 adolescents, had undertaken tertiary education outside of conservation science. Indeed, only one of the participants had studied a biological area (veterinary nursing). Participants' education trajectories are important to their performance of expertise, as their education affects their social position in the interaction. While participants' expert performances cannot be reduced to their understanding of science, or even to their prior interest in penguins, performances of expertise by the zookeepers had a profound effect on the participants' involvement in the Penguin Encounters. This analysis positions the zookeepers' performance of expertise as one of the key factors affecting participants' perception of ZSL as experts in animal welfare and conservation, and indeed their participation in the experience encounter.

'Meet the Penguins' is intended to allow non-experts to participate in interactions with animals in the same respect experts would interact with penguins.

Participants are meant to feel they are participating in a privileged experience. Yet, results of this analysis have found the expert excludes the non-expert from becoming close with the penguins through their actions and discourse. Particular zookeepers reinforce the message of the expert zookeeper. In the case of Nancy, she immediately introduces herself to the visitors as an expert, distinguishing herself from the lay visitor.

Extract 23

> Nancy: 'So [...] Ask as many questions as you'd like, *that's what I'm here for*. Ask then whatever you haven't heard in the talk.'

In the above extract, Nancy, the zookeeper, frames herself as the expert and the visitor as the unknowing layperson. By immediately introducing herself as privileged expert, the keeper jeopardises the legitimacy of using Penguin Encounters for public engagement (Berger and Luckmann, 1991). Extract 23 is further supported by the dialogue below (Extract 24). The adult visitor encourages his son to ask the zookeeper for her 'expert' opinion on the penguins. The zookeeper reinforces the idea that she is the expert, and her opinion would not always be available.

Extract 24

> Nancy: 'I'm trying to spot Egg and Kate, a penguin pair that normally comes up. Ah, there they are. They're the pair there. So, [giggle]....any questions guys, that I can answer, while we wait for anyone to decide to come over and see us?'
> Visitor:' [parent to child] Do you have any questions about penguins? *These are the experts*, so this is the time to ask.'
> Nancy: 'Yeah, this is your only chance to ask.'

Extract 24 exemplifies the performance of keepers engaging with their participants. Participants frame the keeper as having exclusive knowledge. In response the keeper validates their expertise as exceptional. This rhetoric in this exchange serves as an instrument to place the keeper at an advantage over the visitor (Fuller, 1994, Haraway, 1986). Thus, rendering the visitor as lacking knowledge.

One aspect of their expertise, often called into practice by the participants, was the keepers' ability to recall information. Participants were especially interested in learning the personal stories of the penguins. In each of the encounters participants requested several of the penguins names, and generally followed this with requests for individual narratives.

Extract 25

Charlie: which one is that one there then?
Keeper Pete: that one? I can't remember that one's name. so, the majority prefer not to come over here.

Extract 26

Keeper: Does anyone got [sic] any other questions or anything?
Illona: Aww, this one is really cute. Do you know this one's name?
Keeper: I can't see the tag, but I've only been working in this section a couple of months.
(Illona and Cameron, 02 September 2013, London Zoo, During the Visit)

In these extracts, the keeper's expertise in called into question. Expertise is increasingly defined by the ability to recall information (e.g. Stewart and Morrow, *et al*., 2001; Ericsson, and Lehmann, 1996; Stewart and Stasser, 1995; Vicentre,

1992; Groot, 1966), and incorporate that information into a narrative. If a defining feature of expertise is the ability to recall information, the failure to do so puts participants' perceptions of this keeper's expertise at jeopardy. By challenging the keeper's knowledge, visitors challenge the idea that keepers hold expertise of penguins. Questions could occasionally require keepers to re-establish their expert role – example 'we wouldn't do anything wrong'.

Extract 27

Diane: Why is it raining in here?
Keeper: It's a mist that we have installed here. So, the penguins can keep themselves cool, and its great for us as well in the summer. We can come and stand in it. He's like aww, this is lovely. [laughs]. So, yeah, is this your first time visiting the zoo? Or have you been here before?
Diane: We've been here before
Keeper: You've seen it before, yeah. What did you think?
Diane: We came with school.
Keeper: Did you? Oh, okay. What did you think? Do you think its better than what we used to have? Down there?
Diane: Yeah
Keeper: Well, it's more naturalistic in so many ways, anyway.
Diane: Yeah, yeah.
Keeper: Right, so it's better for their feet. I'm not saying we were doing anything wrong in the past. It's just that's what the husbandry and welfare was before and now we've changed it to something different and better.
(Diane and Chelea, 27 August 2013, London Zoo, During the Visit)

The keeper's language in the statements in Extract 27 defines ZSL as a safe place for penguins, managed by keepers who can be trusted. By exercising their authority on the acceptable management of penguins, ZSL keepers establish themselves as gatekeepers to public interactions with penguins.

3.3.3.2. Zookeeper as Gatekeeper

During the encounter, once the expert becomes the authority, they are immediately transformed into the 'gatekeeper'. The gatekeeper acts to guard the layperson's interaction with the penguins, whilst also holding specialist knowledge. For instance, Nancy structures her relationship with one penguin, Pickle, as one of privilege, inaccessible to the layperson.

Extract 28

Nancy: Pickle! Pickle! [clicks] yeah! Yeah! He was a, he's about a year old. It was about this time last year we were hand rearing him, so…
Elizabeth: How old do they live up to?
Nancy: Oh, they can live up to 40 years old.
Visitor: Why is he one of the one's you do this with?
Nancy: Because I hand reared him. [To Pickle] Yeah, huh Pic! Who's good? Yeah, yeah I know! [To visitors] You can see the call he makes *he only does that with me*, because he still has his begging calls, don't you Pics?
(Elizabeth and Megan, 03 Sept. 2013, London Zoo, During the Visit)

This extract illustrates how the keeper sets herself up as privy to this penguin's affections, dismissing the opportunity for individuals to build a bond with the penguins. Certainly dismissing participants' intent to engage with the penguin on an intimate level. While the extract emphasizes the strong bond the penguin has with the keeper, it also promoting the idea that the visitor needs to be an expert to build the same level of relation with the penguins.

Extract 29

Chelsea: You could tell it was really close to the zoo keeper, because it was running towards her.
Diane: It must be attached to her. She obviously spends a lot of time with it.
(Diane and Chelea, 27 August 2013, London Zoo, After the Visit)

Drawing on Berger and Luckmann's argument that 'there is a problem of keeping out the outsiders at the same time having them acknowledge the legitimacy of this procedure" (1991, p. 87), ZSL keepers create a distinctively exclusive environment. By commodifying the interaction, ZSL immediately creates an exclusive environment. Thus, separating general visitor with those who may have a deeper interest in penguins. The divide between keepers and encounter participants is further compounded by the lack of distribution of knowledge within the encounter (Koppl, 2009). Consequently, the exchange (or lack) of knowledge impacts ZSL's identity within the conservation movement (Berger and Luckmann, 1991).

3.4. Participant Expertise

This section focuses on the participant oriented question of this chapter: how do publics perform and interpret scientific expertise? To explore this question, the analysis presented here draws on data collected before, during and after participants' engagement with ZSL staff and encounters with the penguins. As discussed previously, participants did not have significant formal education in the environmental science. Instead, participants drew on a number of other social

experiences to build their understanding of conservation science, and therefore expertise in conservation. Prior to visiting London Zoo, participants' discussions were limited by their perceived lack of penguin knowledge.

Extract 30

> Megan: Um, like, um like if you were a penguin expert then you could tell if the penguin was distressed or something. Right? But, I don't know how penguins act when they are angry, so it would be difficult.
> Elizabeth: Kinda the same as Megan. I don't know how to tell if a penguin is angry, but I guess it would be kinda obvious if you had someone who knew about penguins. It would like show.
> (Elizabeth and Megan, 03 Sept. 2013, London Zoo, Before the Visit)

In this extract, participants employ Giddens' definition of expertise: "any individual who can successfully lay claim to either specific skills or types of knowledge which the layperson does not possess" (1994, page 84). As a result, both individuals discuss how their inexperience with interacting with penguins limits their ability to discuss penguin behaviour, and in turn proper animal welfare. Interestingly, both participants had prior experience with nonhuman animals. Throughout all of the participants' discursive representations of their experiences with other nonhuman animals (including pets and other encounters) participants subtly build their expertise of nonhuman animal behaviour and emotion. During the encounters, participants built upon their previous knowledge of animal behaviour, through interactions with the penguins and keepers. Certainly, the performance of the animal strengthened the participants' perceived knowledge of penguin behaviour (Schuurman and Franklin, 2015). Such modifications can be seen in the following extracts taken from Susan and Charlie's encounter.

Extract 31

Susan: He's so enjoying the stroke isn't he?
Keeper: And some of the ones that aren't hand reared will come in. We've got one [name inaudiable] who will come in, within the last week. It's been here two years- all of a sudden likes to come in. [He] doesn't like to be touched beacuse it gives a little bit of a bite. but its getting calmer and calmer. And theres one, Jack, who really likes to come in here - because he's got a new girlfriend, so he tends to come in here
[Jack with female penguin enters the enclosure, standing between visitors and the female penguin.]
Charlie: He's a bit protective
Keeper: yeah, he doesn't like anyone to go near his girlfrined.
(Charlie and Susan, 05 Sept. 2013, London Zoo, During the Visit)

In this interaction, Charlie and Susan both offer their own explanations of penguin behaviour, adding to the discourse from the keeper, whilst also taking cues from the observed behaviour of the penguins. In the following extract, Charlie seems to compete with the keeper in describing the penguins.

Extract 32

Keeper: [...] They are very inquisitive and normally when one is playing with something they want to have a go.
Charlie: What are they like if you're in the water? Do you go in to clean it out and things?
Keeper: We've rarely ever done it, so most of them would probably stay out. There's one or two of the hand reared ones that....
Charlie: [interrupting] ...that might go oh!...
Keeper: ...that like to rest on peoples shoulder. Just to see what we were doing. Like I said they are quite inquisitive. So, if there are butterflies around they...
Charlie: [interrupting] ...chase it!
Susan: [laughing]
Keeper: Yeah, there are loads of those cabbage white butterflies around.
Both: Yeah! They must love to chase them.
Keeper: They'll actually shoot out of the water onto the land to go after them, and one of the penguins, called Sergey, he's got a red band, doesn't like the gulls.
(Charlie and Susan, 05 Sept. 2013, London Zoo, During the Visit)

The above discourse corresponds with Charlie's need to present herself as knowledgeable. In this context, Charlie using her experience to become a relative expert (Mieg, 2006). In this account of penguin behaviour, Charlie particularly used the knowledge she gained from the keepers, and through the interactions with the penguins, to situate herself as knowledgeable enough to comment on the needs of penguins.

Extract 33

> Charlie: They all seemed very happy, content with their life. Apparently they jump out of the water when they are happy. So, most of them were jumping out of the water, so that's good.
>
> Susan: Like Charlie said they, apparently they jump out of the water and a lot of them were doing that. And they all seemed pretty content. but I am sure there are some somewhere that are not that happy.
>
> (Charlie and Susan, 05 Sept. 2013, London Zoo, During the Visit)

The above use of knowledge gained during the encounter demonstrates how participants incorporated information obtained during the experience encounter into their prior knowledge of nonhuman animal welfare. When discussing if ZSL should continue to run encounters with penguins, Susan and Charlie used their experience to cast doubt on the function of the experience encounters. One way the participants negotiated their opinion of the encounter was through their interpersonal resources. The participants worked together to build meaningful experiences. By working together participants were able to build knowledge, discuss their concerns and recommend action.

Extract 34

Susan: Obviously [the keeper] gave you a lot of information. Um, but then they could just give that information like they were at the beginning during that talk. Yep. Yeah, I think it is nice for some people to get up close.

Charlie: They could have given the information they gave us out to everyone, and not just the close encounter people. It doesn't seem fair we were the only ones to learn about the penguins. Um, I still don't know if it was nessessary to go in there and stroke them. They didn't seem bothered about coming over to us. If they are not bothered then maybe that is just the way it should be.

Susan: Most of them seemed happy and some of them are hand-reared. So, that's what they are used to. They seemed happy and so yeah.

Charlie: They can't get everything that they would get in the wild but the keepers obviously try hard to replicate their enviornment. they still haven't got as much space and freedom as they could have in the wild. They seem pretty happy.

It is through their use of their experiences to relate to the penguins and ZSL, Charlie and Susan developed their knowledge of penguin behaviour to understand penguin welfare and, potentially, to influence their attitudes towards penguin-related conservation efforts. Understanding how participants justify their experience and knowledge is an important part of exploring the construction of ZSL as experts in penguin welfare.

3.4.1. Questioning ZSL's Expertise

In recent times, the legitimation of science institutions, including the work of zoos, has been called into question, with a number of science communication efforts devoted to shoring up trust in the relationship between sciences and society (Jensen and Holliman, 2015; Wynne, 2003; House of Lords Select Committee on Science and Technology, 2000; Giddens, 1990). The delivery of the encounter used

a deficit-informed approach, beginning with the delivery of penguin facts, leaving the discussion open to questions from the participants (Irwin, 2008). Thus, raising a concern that keepers' failure to create conversation left participants open to create their own interpretation of the experience. Ultimately, these participants expressed less trust in ZSL's zookeepers and questioned their expertise.

Although participants had little direct experience of researching or interacting with penguins to draw upon, they drew instead on other experiences in their lives to explain their views of penguins and penguin conservation. The other experiences often were situated in popular media, and conflicting narratives given by the zoo (see Tom Hart's placement within the exhibit). Indeed, one of the common depictions of participants' penguins prior to the encounter featured inaccurate representations of Antarctic habitats. In the excerpt below, Diane negotiates her prior knowledge of penguins with her experiences in the encounter:

> Diane: I was going to say it's a bit odd to have sand and stuff in their enclosure, but then again they are all from hot places those penguins, aren't they? Yeah, cause the ones we saw were obviously in a big iceberg with proper ice and everything, but they are not all from that, so they may not be used to [the cold]. It's hard to see them on sand; you just naturally associate them with icebergs. There could be more variety though, in their enclosure, some hills and things. It's sort of like flat isn't it?
> (Diane and Chelsea, 27 August 2013, London Zoo, After the Visit)

Indeed, this transformation in Diane's thinking is illustrated in the comparison of her pre-visit to post-visit drawings:

Figure 9: Diane's pre-visit drawing of herself and a penguin

Figure 10: Diane's post-visit drawing of herself and a penguin

Although the habitat of the penguins was not specifically discussed during the encounter, Diane incorporates her experience during the encounter into her existing framework of penguins, removing igloos from her knowledge of ZSL's penguins, nullifying ZSL's expertise of Antarctic penguins. Building on this

framework, Diane uses her knowledge of animal welfare to suggest the penguins may need more stimulation. It is likely Diane is deriving her opinion from her experiences with other nonhuman animals (such as her pets) and images she witnessed through media. Frequently, participants worked together to negotiate their experience, justifying their opinions through prior knowledge. In the extract below, Illona and Cameron construct an argument for more meaningful interactions with ZSL:

Extract 35

Illona: I think it would have been good, it would have been interesting to learn where the penguin came from, which ones, the wild - which zoos they came from, that sort of thing. Um, and I think it would have been good to learn about the conservation work the zoo does, like outside, and more about the environment they come from and I know its kinda depressing and whenever you go and watch like the kinda documentary ones and now you have the moral bit, but I really think they could have had a bit in about like climate change and how it's effecting penguins. I really feel that that would have been really interesting to learn about.

Cameron: Yeah, I'm not really sure. I guess we were able to ask questions, but I don't really know how endangered penguins are. So, I have this feeling that they are quite safe actually, but climate change but be having some effect. It would be nice to, I thought I might find out while I was there but I guess I didn't. I was interested, I thought of asking here but I thought it would be really complicated question but um I'm interested in like what the evolutionary tree looks like around penguins. it seems like a rather big jump to go from flying bird to swimming bird.

Illona: Yeah, that would be really interesting to learn about, just generally, like what research has been done recently on penguins. On kind of like general topics, like emotional intelligence - that kind of thing. That would have been really interesting to discuss.

(Illona and Cameron, 02 September 2013, London Zoo, After the Visit)

Illona and Cameron's conversation highlights two perceived limitations to their visit. Both participants related to the encounter using previous knowledge they gained from popular media. Illona and Cameron both avid documentary viewers, and were interested in the more explicit details of ZSL's penguin conservation programme to add to their prior knowledge of penguins. As a result of the limited engagement, participants were the limited in their ability to make sense of ZSL's role in penguin conservation. What these findings suggest is that the opportunity to engage participants in deep, meaningful discussion of ZSL's expert work in conservation was neglected, leaving participants to construct their own narrative. These findings also suggest that while the human–animal relationship can be used to inform the construction of expertise, without facilitation the relationship may be subversive to the performance of ZSL's expertise (Schuurman and Franklin, 2015). The distinctive pattern of delivering the encounters as deficit-informed uncovers a view of expertise held by ZSL, possessing privileged knowledge to be delivered to attending publics. This authoritative discourse by ZSL is often mediated by participants' knowledge of penguins and conservation framed by media, which opens questions to the discursive power of celebrity experts.

3.5. Celebrity Expertise

Recently, the way in which publics have gathered their information on science has shifted, altering whom publics trust as communicators of science (Yearly, 2005). Celebrity culture is a primary component of the modern social

construction of science expertise. Whilst most definitions of expertise involve the academic qualifications of the expert, recent changes to the communication of science have meant publics may be redefining experts of science communication to include celebrities. This section considers how television and film celebrities contribute to the construction celebrity experts, whose function as the embodiment of environmental science.

While the participants' personal experiences with penguins and conservation were not uniform there was a convergence on their experiences of popular media. Popular media was an influential aspect of participants' acceptance of ZSL as an authority on conservation science. Indeed, Huggan (2013) argues it is the celebrities who are able to make the biggest impact on the environmental agenda. Celebrities can act as a mechanism to transfer knowledge of a complex subject in a user-friendly form. Yet, the reliability of such information has largely been contested.

Each of the participants arrived at the experience encounter with knowledge derived from celebrity culture. While most of the participants had not come into contact with conservationists, all indicated having seen images of conservationists, or conservation messages, in popular culture. Television displays images of fabricated conservation, and biodiversity, which construct an experience that shape participant's views of the conservation research and penguin lives. Participant's perceptions of expertise are drawn from these images. Although images of conservation and penguins in media vary, years of research on television

and film viewing have documented publics absorb what they witness (Fisch, 2004; Bandura, 1994). Two prominent figures featured in participant accounts of prior experience with penguins: Sir David Attenborough and Mumble, a computer-animated penguin from the film Happy Feet (2006). The way in which these images are incorporated and recalled by encounter participants are important to examine because of the potential role these images influence the participant's perceptions of experts in the field, and ultimately, influencing participant's ability to participate in the Penguin Encounter and with zoo keepers.

3.5.1. Mumble, Ricky, Pingu: Celebrity Penguins

Celebrities can exist outside of human forms (Asherie, 2007). As researched by Asherie (2007), animal celebrities are often the central figure in television and film roles. Indeed, animal celebrities are often the first celebrities of childhood, including characters such as: Bambi (Algar, et. al., 1942), Nemo (Finding Nemo, 2003) and Simba (Lion King, 1994). These celebrity animal characters are well known to children, and carry with them messages of conservation information. As Whitley (2008) discusses, Disney animated features serve as the foundation to a majority of English-speaking society's notions of nature. Disney constructs their nature narratives using emotion, rather than science fact, to develop empathy for their characters. Through these films children are first encouraged to be defenders of nature (Whitley, 2008). Building on Whitley's arguments, it would appear nature animation emerged as a key vehicle for developing empathy for the plight of

nature, whilst communicating ideas of conservation. Thus, these films should be considered an integral part of the construction of conservation engagement.

As part of this research, participants discussed their knowledge of animated penguin films and television series. All of the participants indicated watching animated penguin films. Amongst the participants, knowledge of animated penguins served as a basis for social resources, a way to engage with the idea of penguins:

Extract 36

Researcher: So, have either of you watched any penguin movies or shows?
Candice: Happy Feet!
Researcher: Happy Feet?
Sandra: [to Candice] Did you watch that?
Candice: Yeah!
Researcher: Did you like Happy Feet?
Candice: Yeah, I think so.
Candice [to Sandra]: Have you not seen Happy Feet?
Sandra: No, I haven't. I don't think I've seen any movies with penguins in them, actually.
(Candice and Saundra, 19 August 2013, London Zoo, Before the Visit)

Candice, who identified as a penguin fanatic, attempts to her experience of watching penguin films to relate to her co-participant. In the extract, Candice exhibits distress in Saundra's lack of experience in seeing Happy Feet, a prominent film in the behaviour and conservation of penguins. She follows this line of questioning on Happy Feet to include a number of other animated penguin films and television series:

Extract 37

Candice: What about Madagascar? That's got penguins in it.
Sandra: No, I didn't watch Madagascar. Too much cartoon [laughs]
Researcher: Are you not a cartoon person?
Saundra: No, I like real movies.
Candice: Yeah
Saundra: No, none of the animal movies. Maybe Stewart Little.
Candice: Oh dear.
Saundra: are there any more movies with penguins in them?
Researcher: there are quite a few
Candice: Does Surf's Up got penguins in it?
Saundra: I'm not sure.
Candice: There are movies like March of the Penguins, have you seen that one?
Saundra: Maybe, I don't think so.
Candice: Pingu?
Saundra: Oh, I have watched a programme! [laughs]
Candice: I loved Pingu.
(Sandra and Candice, 19 August 2013, London Zoo, Before the Visit)

Candice interrogates Saundra to establish a shared knowledge of penguins. Candice finds it difficult to negotiate Sandra's lack of experience with animated films. Once the pair establishes a shared experience (watching Pingu (1990)), the participants each use their shared experience to navigate each other's expertise. In the extract below, Charlie and Susan negotiate their knowledge of penguins through their knowledge of animated penguins.

Extract 38

Charlie: I can picture a penguin in my head. I couldn't tell you what the breed of it is.
Researcher: That's okay.
Susan: Mine's my own breed
Charlie: Oh, okay. I'm going to think of Pingu now instead.
Susan: You can't draw Pengu!
[pause]
Charlie: Can I draw Pingu?
Researcher: You can draw whatever penguin you like.
[pause]

Charlie: Oh, this is really bad.
Susan: Oh, mine just doesn't look happy and that makes me sad. I thought I was going to draw him happy. He just doesn't look happy. Smile!
Charlie: Are they supposed to show emotion? Pingu doesn't show emotion.
Susan: Pingu's not real! Real penguins show emotion. Mine looks more like the one in Happy Feet.
(Susan and Charlie, 05 Sept. 2013, London Zoo, Before the Visit)

This extract illustrates how participants' ideas about penguins are framed in terms of animated penguins. Certainly, animated penguins in television series and films influence or reinforce participants' perceptions of penguin behaviour and the state of nature. Thus, several of the participants justified their knowledge of penguins through the framing of animated characters. The narratives of these characters has lasting effects; superseding information received from education programmes, often forming the basis of participant knowledge:

Extract 39

Illona: Ah. Is it true that with the song they each have a song. Like in Happy Feet?
Keeper Pete: These guys [Humboldt penguins] don't. Well they bray, where it's also called jackassing penguins because they sound like donkeys.
Illona: Oh okay. Well I saw it on Happy Feet, and another documentry. I think.
Keeper Pete: They make a lot of donkey noises. Um, whereas Ricky honks, but I think other species sort of do have calls. Kinda like owls
Illona: Yeah. I wonder if he grew up with the other penguins, whether he would make the same noises they make?
[silence][Illona and Cameron move to one side]
(Illona and Cameron, 02 September 2013, London Zoo, During the Visit)

The competitive interaction between the keeper and Illona acts as a mechanism for Illona's disengagement in the encounter and ultimately her dismissal of the keeper as expert (as illustrated in Extract 35). The keeper's discourse is ineffective in delivering information to participants, hindering participants' participation in the encounter. The dismissal of Illona's knowledge by the keeper is discouraging to Illona. Immediately following the discussion, Illona and Cameron moved away from the keeper, and other visitors, to a space of their own. This extract exemplifies the problem of expertise; Illona is faced with evaluating two expert discourses and deciding, "which of two or more rival experts is most credible" (Goldman, 2001, p. 85). Often, the animated penguin was given precedence. It seems media, certainly big screen animations, with a global reach, have great potential to influence public knowledge and attitudes (Li Yong *et al.*, 2011). As established, participants are capable of interpreting messages from animated feature films. Therefore, when opposing issues are presented animated films will often be the accepted 'truth' (Koppl, 2009). To create a successful conservation programme Li Yong *et al.*, (2011) present the argument that conservation institutions are not yet capitalising on the potential of animated films, and celebrity penguins.

3.5.1.1. Ricky the ZSL Penguin Celebrity

In this section, I outline how ZSL structured one of their penguins as a celebrity. One common assumption of celebrity studies has been the assumption

celebrities needed to include a human element (Turner, 2010; Marshall, 1997; Dyer, 1986). I reject these arguments, and instead employ Giles' (2013) distinction of celebrity as 'essentially a process by which media turn individuals (not necessarily humans) into objects of desire' (p. 116). In the case of ZSL, they constructed 'Ricky the Rockhopper' as their resident celebrity. Ricky is the only Rockhopper at ZSL, and therefore is very distinctive from the other penguins. Giles (2013) notes how zoos often use distinctive animals to draw publicity to their efforts, by celebrating the animals' attractiveness. This method of drawing attention to Ricky and ZSL's in-situ conservation work was a prominent aspect of the 'penguin talk':

Extract 40

> 'Now, rockhoppers come from very rocky terrain so they developed a very good technique of hopping from rock to rock. Ricky the rockhopper demonstrates this very well here at Penguin Beach. Sometimes even pushing the other penguins out of the way, because like i said before he is a little bit of a diva. But he's being just a little bit stubborn at the moment he's just on the rock, showing off there posing. he's a bit of a show-off.
> (Keeper Talk, 02 September 2013, London Zoo)

In the excerpt above, Ricky is described as having anthropomorphic qualities. Giles suggests the use of human qualities by the presenter is done so with the intent to draw human interest to the species (2013). The following two-part example first establishes Ricky's celebrity, utilising Ricky's constructed celebrity to promote the work of ZSL:

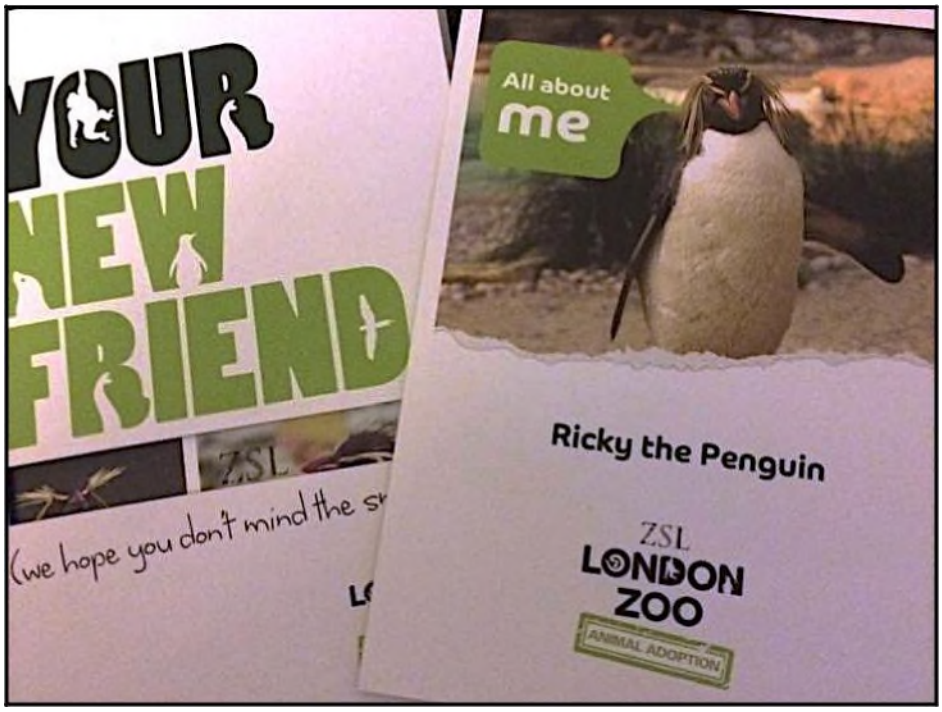
Extract 41

> Ricky is on Facebook. So, if you're on facebook, search for ricky the rockhopper and add him as a friend and you'll get regular updates of

> what is going on here at penguin beach and it's also really cool to have a penguin as a friend on Facebook. but if you really do fall in love with Ricky the Rockhopper you can actually adopt Ricky. This doesn't mean you get to take ricky home. I do not advise that. he eats a lot of fish and he's not toliet trained. but what that does mean is the money you give to adopt ricky goes towards the fantastic work that we do at ZSL. (Keeper Talk, 02 September 2013, London Zoo)

In these excerpts, ZSL constructs Ricky for promotional purposes. Indeed, Ricky features heavily in promotional material for ZSL:

Figure 11: Adopt an animal: 'Ricky the Penguin' adoption pack



In featuring Ricky in promotional material, ZSL encourages the public to recognise their expertise in conservation science. In the extract above, the keeper reinforces the notion that ZSL is one of the only ones who are equipped to care for a penguin.

Extract 42

> ZSL is a charity that consists of london zoo, whipsnade zoo and the conservation work in over 50 countries, including helping our little penguin freinds out in the wild because some of them are actually endangered. But fact by coming to London Zoo today and seeing our penguins having their lunch you are helping wild penguins because your ticket money goes towards fantasitc conservation work, so give yourselves a pat on the back for that. If you want to find out more about that, head on over to base camp, which has some fantastic pictures and information that tells you a bit more about what we are doing out in the wild with our penguins.'
> (Keeper Talk, 02 September 2013, London Zoo)

Giles claims celebrity animals in zoos, such as Ricky, are constructed as such due to their 'important function of generating publicity for the zoo or other institution where they are kept' (Giles, 2013, p. 119). In generating their expertise, zoos create the illusion of substantial knowledge in the husbandry of and guardianship for wild penguins. In much the same way human celebrities support a cause, and therefore validate the function of the cause, Ricky's celebrity endorsement of ZSL validates ZSL's function as conservator of animals. Yet, Giles takes into account the role of the zoo in constructing the animal as celebrity. As seen in extract below, the keeper reinforces the message of the penguin talk, promoting Ricky's celebrity status:

Extract 43

> Keeper Pete: [talking to Ricky the Rockhopper] He's got his own Facebook page.
> Group: [Laughter]
> Visitor: Oh, has he?
> Keeper Pete: Yeah! He just says what's going on around the zoo, that sort of thing.
> Visitor: I'll have to friend him.
> Keeper Pete: I'm not sure who maintains it. He does feature in a song. If you type rockhopper song into Google, his song comes up.
> Charlie: I'll have to look that up.

Susan: [laughs]
Keeper Pete: He supplies the like honking sound.
Visitor: Ah, okay.
(Susan and Charlie, 05 September 2013, London Zoo, During the Visit)

These extracts back up research suggesting zoo animal celebrities are created over time by the institution and through media (Giles, 2013; Turner, 2010). Ultimately, ZSL and the media have successfully constructed Ricky as a celebrity, in his own right. Ricky is prominent in visitor accounts of ZSL. The celebrity status of Ricky presents ZSL with the opportunity to establish their expertise in animal husbandry. As Ohanian describes, celebrity endorsements of a product (in this case ZSL) transmits expertise to the product (1990). Applying this non-traditional definition of celebrity, ZSL is able to validate their expert status. Thus, generating revenue and publicity for ZSL (Giles, 2013).

3.5.2. David Attenborough: Conservation Celebrity

> "Birds were flying from continent to continent long before we were. They reached the coldest place on Earth, Antarctica, long before we did. They can survive in the hottest of deserts. Some can remain on the wing for years at a time. They can girdle the globe. Now, we have taken over the earth and the sea and the sky, but with *skill and care and knowledge*, we can ensure that there is still a place on Earth for birds in all their beauty and variety. If we want to. And surely, we should."
> -- Sir David Attendbourough (The Life of Birds, 1998)

The previous two sections explored how penguins, real and animated, are given celebrity status and thus influence participants' participation in conservation discourse. In this section, celebrity expertise is expanded to explore the role of celebrity conservationists, especially the function of Sir David Attenborough. Attenborough featured as a central theme in participants' articulation of

environmental science. Attenborough, a British national treasure, is a 'popularizer of science, [rather] than a popular scientist (Huggan, 2013, p. 24). Indeed, several people have scrutinized Attenborough for not being a true scientist, yet Attenborough is recognised throughout the present data as having specialist position in the conservation movement, evident in the extract below.

Extract 44

Candice: There's the David Attenborough documenteries, like he did a show not that long ago on BBC
Sandra: Of course, but everyone's seen those. We had to watch them in school and he's on tele all the time.
(Sandra and Candice, 19 August 2013, London Zoo, During the Visit)

Sandra suggests Attenborough is a universally known celebrity conservationist. Certainly, Attenborough has been recognised as one of the most popular individuals in the conservation movement (Huggen, 2013; Young, 2009). What is unclear from this excerpt is the role Attenborough's popularity plays in the participants' construct of conservation expertise. Previous research by Boykoff and Goodman suggests the role of Attenborough in public perceptions of expertise may be in opening up environmental science (2009). In this sense, Attenborough is an 'authorised speaker" (Boykoff and Goodman, 2009, p. 396), acting as the link between environmental scientists and public consumption of the environment. The quotation below exemplifies the way in which participants justified their own knowledge using Attenborough's authority.

Extract 45

Sandra: They do like big packs though. That sounds really wrong doesn't it? Like if they were going to find fish, a load of them would go together. From the programmes I've seen anyway.
(Sandra and Candice, 19 August 2013, London Zoo, During the Visit)

As previously discussed, Sandra was not a consumer of penguin media. In reality, the primary media sources Sandra consumed were Attenborough's documentaries. Sandra situates her knowledge of penguin fishing techniques in her experience of watching Attenborough documentaries. Whilst her knowledge may not be 'factually correct', Gouyon argues the role of nature documentaries is to situate 'science knowledge' in popular culture (2011). In doing so, publics extract facts and emotions from celebrities, constructing knowledge of the natural world (Gouyon, 2011). Knowledge derived from this celebrity is used to validate participant's engagement with the keeper:

Extract 46

Keeper; so penguins don't actually sleep. they um nap. because in the wild there would be predators.
Cameron: uh huh
Keeper: They just kinda uh, they just kinda power nap throughout the day.
Cameron: hum. Well, how much sleep do they need...[cut off]
Keeper: I dont know.
Cameron: ...has anyone done the research?
Keeper: I don't think it's very much sleep.
Cameron: some birds spend their whole lives in the air, don't they? sleep while gliding. I saw that on the Attenborough nature show the other day
Keeper: Yeah, there is a kind of species that I read about them once that kind of nap while they are flying.
Cameron: Uh huh, yeah they can't be sleeping that long, I suppose.
Keeper: Yeah they just kind of, i guess...[cut off]
Cameron: Yeah
Keeper: Shut down a little bit.

Cameron: Yeah
(Illona and Cameron, 02 September 2013, London Zoo, Before the Visit)

Participants' use of Attenborough, to validate their knowledge, demonstrates their judgments of trustworthiness and expertise, highly influencing their knowledge of the environmental world. Not only do celebrities need to exude expertise, Huggan suggests the knowledge gained from celebrities is not simply about gaining expertise but is largely about the 'embodi[ment] of knowledge in particular individuals, giving them an authority and, perhaps more important, a *believability* that doesn't necessarily correspond to their professional credentials' (2013, p. 25). Indeed, the failure of ZSL to be believable may be the detriment of the Penguin Encounter. In the extract above, the keeper falters in his responses. Cameron's reactions to the keeper's responses suggest he doesn't have confidence in the expertise of the keeper, and in turn ZSL. As part of the encounter, Attenborough empowers participants to engage with the keeper, employing their knowledge of animal behaviour. The empowerment of participants positions them to judge the expertise of ZSL.

3.6. Tracing Processes of Expertise

This chapter brings together analyses and concepts of expertise to illustrate how expertise is performed and interpreted by those participating in Penguin Encounters. Expertise is not simply a hierarchy of knowledge; rather it is a mediating device in the communicating science. Expertise serves as tool for publics and science to form relations and influence participation in science (Grand, *et. al.,*

2015; O'Regan and Killian, 2014; Rowe and Wright, 2001). Each of the concepts illustrated in the previous section serve as a potential juncture in conceptualising expertise. Each juncture in expertise represents the process of the performance and perception of expertise occurring. A process model of participants' movement through these junctures was created from the data using the Trajectory Equifinality Model (TEM) (Figure 12).

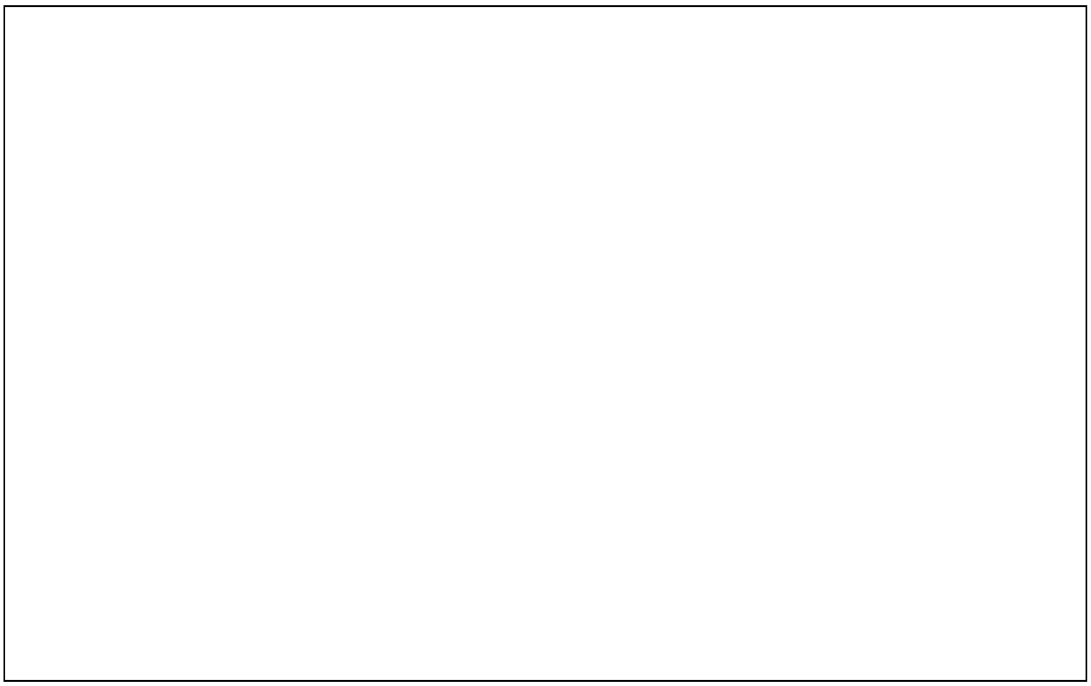
The construction of ZSL's expertise over time, from the viewpoint of the participant, is important in understanding how encounter participants incorporate and participate in the rhetoric of conservation science. As Berger and Luckmann (1966) argue the social construction of knowledge is influenced by expert messages, which explains how specific ideas and practices are incorporated into individual constructs of reality. Participants encounter conservation messages regularly, which means opportunities for modifications to participants' recognition of expertise are frequent. This means public perceptions of ZSL's role in conservation can fluctuate over time. Thus, ZSL's role in society, as educator, research institution or entertainer, is transformed.

When they were first interviewed, participants were at the point of visiting London Zoo. Their opinions of ZSL's expertise in conservation research and ability to care for animals were formed. Although having arrived at the same equifinality point – attending ZSL's 'Meet the Penguins' encounter, their diverse trajectories significantly influenced their trust in ZSL's programmes. Celebrities, television, films, newspaper stories and prior experiences at wildlife parks contributed to the various

routes that could be taken by participants in the construction of ZSL's proficiency in conservation science.

For example, in the case of Illona, she had developed a high level of personal expertise. As a child she grew up in a family who had an invested interest in wildlife. Thus, one of Illona's earliest memories is watching David Attenborough on television with her parents. David Attenborough is then the basis of Illona's perception of conservation expertise. Amongst the participants this was an equifinality point. As time progressed Illona found herself watching penguin cartoons, including Pingu. Subsequently, Illona took a strong interest in wildlife documentaries. She developed an interest in wildlife, and conservation, which led her to seeking information out in the media. Upon her entrance into the ZSL, she had accumulated a multifaceted construct of conservation expertise. Due to the influence of the media, Illona was supportive of ZSL's role in conservation. As Illona began the encounter she was motivated to engage with the keeper. However, the keeper's contradiction of Illona's contribution of her knowledge of another expert's knowledge leads her to disengage in the experience encounter. Although the keeper does attempt to reengage Illona in the encounter, Illona remains in a private discussion with her co-visitor.

Figure 12: TEM model of Penguin Encounter expertise



The study of ZSL's expertise focuses on the participant transformations and acceptance of ZSL's role in conservation. Certainly the study seeks to explain the mediating role of 'other' expertise in the experience encounters, and the influence of expertise on participants' engagement with ZSL.

3.7. Chapter Conclusions

The core questions used to frame this chapter were: What factors underpin the construction of expertise amongst Penguin Encounter participants? On what basis is the Zoological Society of London constructed as a source for involvement, information and expert commentary on conservation science? How do the Zoological Society of London, ZSL staff and participating publics incorporate, perform and perceive scientific expertise? To answer these questions, I assert the

way in which participants construct ZSL, as experts, cannot be duplicated. That is to say there are changes over time in social constructs of zoos and interpretation styles within the zoo. Therefore, this study cannot be repeated identically, as time cannot be repeated. Over time new layers of potential expertise in conservation will be introduced to the experience. Using this framework, participants' attitudes and knowledge are mapped on to previous knowledge (Tobin, 1993). I identified several aspects, which could influence public attitudes and knowledge: the construction of institutional expertise, performance of keeper expertise, participant expertise and celebrity expertise.

Through participants' responses, this chapter illustrates how facets of conservation knowledge and attitudes are woven together in the construction and acceptance of ZSL as a conservation expert. It is clear participants' prior experiences are powerful mediators of the Penguin Encounter. Based on the research of Koppl (2010), these findings are in line with the social construction of expertise. For ZSL, the existence of a diverse range of experiences of participants, within the environmental movement, and the multiple renderings of ZSL factor into the ZSL's defence of their own expertise (Koppl, 2010). ZSL utilises their historical position as purveyors of environmental knowledge to legitimise their current actions, whilst also dissociating themselves with anti-zoo rhetoric (Berger & Luckmann, 2006). ZSL's approach to building exclusive expertise is important in the process of knowledge and attitude creation amongst their visitors. The most prominent feature of ZSL's construction of expertise has been their prominent use of the

deficit model (Irwin, 2003). One of the primary factors in ZSL's failure to build participants' absolute trust in ZSL's participation in conservation science has been their use of the deficit model.

Accompanied by pro-zoo media, anti-zoo media and other anti-zoo sources perform an unexceptional role in public trust in zoos. While it might be argued the media play an essential role in developing public trust in ZSL's conservation efforts, the polarity of media stories act as a mechanism for participants to develop conversations on the moral of ZSL. Only in the absence of pro-zoo rhetoric does anti-zoo accounts completely fracture public trust in ZSL's role in environmental science.

The most effective, and trustworthy agent in the construction of conservation knowledge is not ZSL, nor the news media, but rather celebrities. Participation of participants in the conservation movements, and indeed the Penguin Encounter, is shaped by a number of celebrities. Celebrities were given privileged status in participant's knowledge of environmental science, more so that actual scientists or ZSL. Celebrities, as sources of knowledge, exerted greater control over public trust in science and the environmental movement than news media or ZSL. Results of this study support Huggan (2013) and Bouse's (2000) argument that celebrity conservationists 'help build trust by breaking down the barrier between the scientific expert and layperson' (Huggan, 2013, p. 224). Through these celebrity interactions, participants built attitudes and knowledge of the conservation movement and of penguin behaviour. Participants' were observed

incorporating expertise gained from celebrities during the encounter to contextualise their experience. The validation of participant knowledge typically reinforced or impaired participants' engagement in the encounter, and ultimately their trust in ZSL. These findings raise the possibility that public trust in celebrity conservationists challenge what participants' count at 'legitimate knowledge' (Irwin, 2003, p. 38). Certainly, there are a number of social forces influencing the construction of participants' trust in and perception of ZSL's expertise in the conservation movement.

Chapter 4. Communicating Environmental Risks

4.1. Introduction

This chapter addresses the phenomenon of the construction and negotiation of discourses of risk within the penguin encounter. In light of the construction of risk discourse, I will investigate how negotiations of risk and contact with individual animals impacts participants' development of species level environmental concern. Extending the discussions of the construction of expertise, this chapter examines participants' construction of environmental risks, and the influence of ZSL in the negotiations of risky behaviours. Thus, this chapter explores in more detail the influence of the ZSL's expertise during the experience encounter in relation to participant attitudes regarding environmental risks. This chapter will explore how the impacts of discourses of risk during the encounter influence participants' perception of risky behaviours, in particular interactions between humans and other animals. Chapter 3 discussed the construction of conservation expertise, and the important role the perceptions of expertise played in participating in the penguin encounter. Ultimately the construction of expertise directed individuals towards pro- or anti-zoo stances. This chapter investigates participants' perceptions of environmental risks and experiences during the encounter to give a detailed account of the development of risk perceptions. In doing so, this chapter seeks to provide an understanding of how and why perceptions of risk change over time.

This chapter draws on understandings of science communication and risk discussed by Irwin (2014); Bell (2012); Wright, Bolger and Rowe (2002); and Beck (1999), to explore the role of ZSL, and the penguin encounter, in constructing participants' understanding of threats facing wildlife, and the actions necessary to protect animal habitats, the environment generally and to maintain biodiversity. Following on from the previous chapter on expertise, I draw on prior research on the discourses of environmental risk, in particular Carter and Charles' (2010) and idea of 'nature' in crisis and 'society' under threat. In addition, this chapter seeks to add to the emerging field of human-animal interactions, as a social mechanism for cultural change.

Interrogating ZSL's construction of 'nature at risk', and the development of discourses of risky behaviour, the chapter argues nature is structured by ZSL within an 'environmental crisis' framework. By examining how ZSL positions risk in this way, this chapter discusses how participants incorporate ideas of 'environmental crisis' into their values and attitudes towards 'nature'. I go on to argue that although ZSL seeks to develop values of environment, the discourse of risky behaviour in the encounter impacts participant values of nature.

In the first of the two sections of this chapter, ZSL's institutional construction of risk is investigated, whilst the second section analyses the participant and keepers' discourses of risk, including the impacts of those discourses. In the first section, I examine key documents (including interpretive panels) produced by ZSL and the media. In the second section, I analyse participant

and keeper discussions, as well as participant drawings, to illustrate the impact of risk discourse on participant environmental attitudes. In this chapter, three primary questions were explored: a) What risk language does ZSL employ when discussing ZSL's role in the modern environmental movement? b) In what way does ZSL's presentation of risk influence participants' attitudes and values? c) How does ZSL's discourse of risky behaviours influence the participation of participants in pro-environmental discourse?

4.2. Framing of Risk by Zoological Organisations

To understand participants' construction of risk, fundamental information on how participants' come to encounter risk messages needs to be understood both from a micro and macro level. Therefore, the origination of risk communication at an organisational level is essential to understand how ZSL positions risk. I begin exploring the dynamics of the environmental science communication process, and its influence on participant's value of nature. The construction of environmental crisis, namely catastrophe of species lost and climate change, has led to the development of organisations assuming the role of saviours of nature (Bell, 2012). Institutions such as the Zoological Society of London, the World Wildlife Federation, Greenpeace and countless others have established themselves as 'defenders of the natural world' (Greenpeace, 2014), which can be achieved by 'safeguarding nature' (WWF, 2014) and serving as an 'authoritative sources of information on biodiversity and conservation action, including conservation policy and guidelines' (IUCN, 2014).

Employing environmental sociology perspectives, this section illustrates how zoological organisations, especially ZSL, locate themselves as a key figures in the fight against environmental crisis, through their discourses of risk and crisis. Dialogues of risk put forth by zoos are situated within a larger framework of 'risk society' (Beck, 1992). Amongst environmental risks exist risks, which originate and spread beyond national contexts (Beisheim, et al., 1999; Beck, 1992). Examples of these risks include climate change and species loss. Risks of this magnitude cannot be controlled or mitigated by just one nation or organisation (Jensen, 2012; Haas, 2000). The negotiation of global risks requires the engagement of a global set of scientists, governments and publics (Trench, 2005). In re-thinking the role of zoos, World Association of Zoos and Aquariums (WAZA) sets out to construct a global social movement in mediating environmental crisis interventions. In a position statement in 2009, WAZA situates the role of zoos in society as role models and facilitators of pro-environment actors. In this role, zoos should educate society on the crises facing the world, including bringing society to action:

Extract 47

> The World Association of Zoos and Aquariums (WAZA) represents a community of over 300 member institutions with a mandate of wildlife conservation, scientific research and environmental education. This position statement is necessitated by these responsibilities and an appreciation of the threat to the natural environment, to species and to current and future generations of humanity.
>
> WAZA recognises the severe threat of human-induced climate change to life on Earth [1]. The risk is so great because atmospheric CO_2 concentrations have already exceeded the safe planetary boundaries necessary for biodiversity and humanity alike and these urgently need returning to safe levels while it is still possible to do so [2–4].

> The best available science supports the conclusion that there is an urgent need to restore Earth's energy balance by returning atmospheric CO_2 levels to below 350 parts per million (ppm) [4]. [...] If we fail to return CO_2 levels to below 350 ppm, the processes of environmental change [...] will pass beyond humanity's control [2–4,6].
>
> Because the full impacts of current CO_2 levels will take several decades to become evident, due to climate system inertia, it is understandably difficult to appreciate the danger that CO_2 levels above 350 ppm constitutes. Risk perceptions are further compromised by *widespread* understating of the dangers we are facing.
>
> The international community must agree to take effective action to return atmospheric CO_2 concentrations to below 350 ppm while it is still possible. Of crucial importance to achieving this goal is an urgent phase-out of coal emissions by 2030, reversing the destruction of natural habitats and reversing the negative net impact of agricultural practices. These actions are also essential for helping humanity and wildlife contend with the many unavoidable impacts of climate change [2–4,7].
>
> WAZA institutions recognise the urgency of, and commit to reducing their carbon footprint and addressing climate change issues through their business practices, institutional culture, conservation and research programmes. WAZA institutions also recognise the urgency of conveying the threat issues and response imperatives highlighted in this statement through their education and training programmes and community engagement initiatives.' (Climate Change, Position Statement, 2009)

According to Bell (2012) WAZA's commitment to environmental conservation is a product of the reflexive modernity. As discussed in Chapter 1 the activities of zoos were significantly altered in the recent past. Zoos turned to reflect on their roles as menageries, focusing instead on their role within the environmental crisis. Re-thinking their role in social-nature relationships, zoos have restructured their programmes to model pro-environmental attitudes (e.g. Bell, 2012; Carter and Charles, 2010; Jensen, 2010).

Risk to nature, according to the environmental movement, culminates in anti-environmental actions, including the destruction of Earth's species due to the overuse of resources and pollution. Jamison (2001) argues these risks are 'given' to publics by environmentalists, who reject the exploitation of nature by science and society. Examples of risky behaviour in this environmental risk scenario include over-fishing of critical species and continued dependence on fossil fuels. Beck's notion of reflexive scientisation captures the idea that decision-making on environmental risks should open up for social rationality, demystified and not prescribed by one social group (1992, 1999).

The conservation messages focuses on the 'demystifying environmental science' and the lack of knowledge on the part of the participant, assuming if only the public was aware of the ever growing environmental crisis then publics would adjust their behaviour accordingly (Ogden and Heimlich, 2009). In other words, zoo-based environmental science communication is essentially about risk communication. For example, Zimmerman et al. (2007) suggests through their actions, as reflexive organisations, zoos and aquariums preform an important function in engaging publics in pro-environmental discussion, while modelling pro-environmental behaviours, ultimately reconciling environmental crisis issues (Zimmerman et al., 2007).

4.2.1. ZSL's Positioning of Environmental Risk

As I discussed in above, environmental crises are constructed and implemented in ZSL's public facing interpretation. The data for this section comes

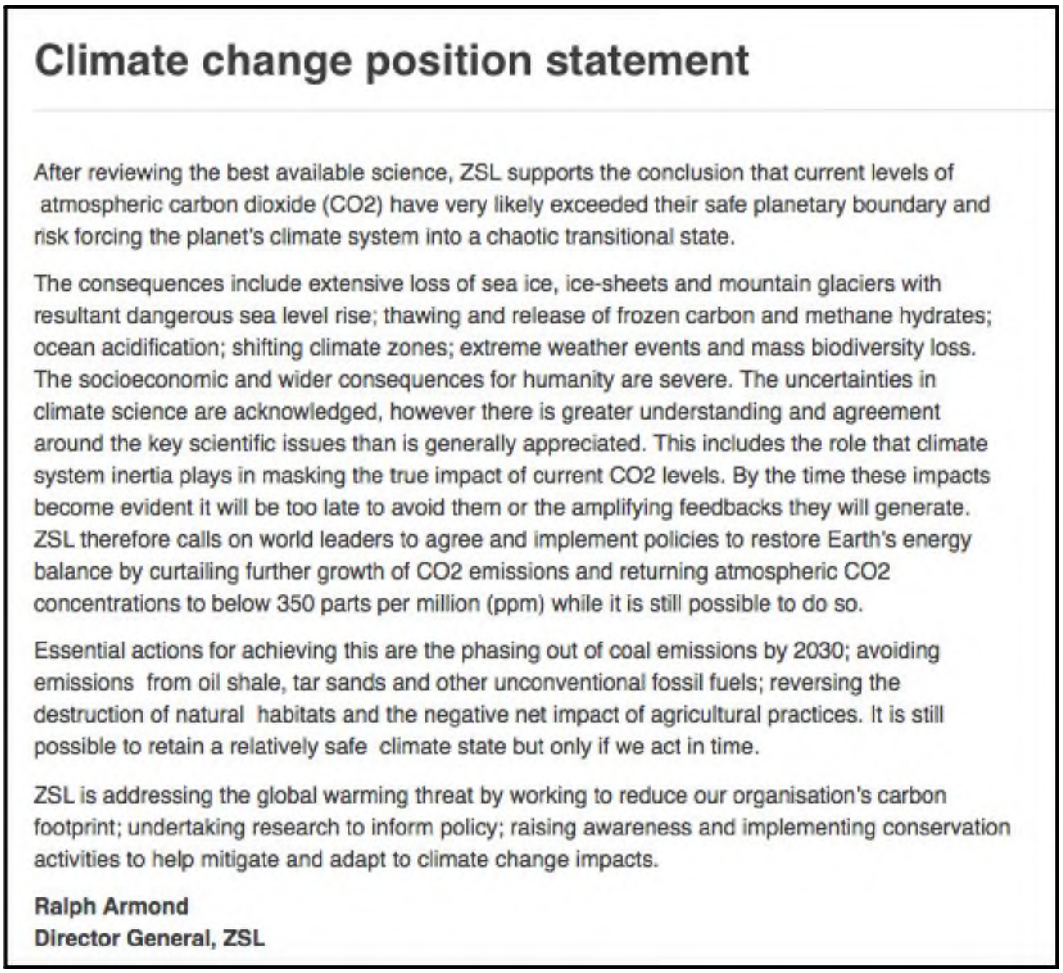
from an analysis of ZSL's online statements and Penguin Beach interpretation, focusing specifically on those pieces that discuss environmental issues.

Employing WAZA's construction of the role of zoos in preventing environmental risk, this section now turns to explore ZSL's construction and implementation of risk discourses through their interpretation strategies. By examining ZSL's institution-wide position on environmental crisis, we can begin to understand their strategies for engaging publics in environmental risk management. Framing my analysis of the construction of environmental risk by ZSL, I argue ZSL's expressions of risk anxiety are nuanced, at times reflecting ZSL's focus on contact risk, and at other times articulating alternative concerns.

4.2.1.1. Climate Change Position Statement

A position statement put forth by ZSL suggests ZSL is operating in the reflexive modern 'risk society' construct (Bell, 2012; Beck, 1992). Indeed, climate change position statements are often a central facet of zoo environmental risk proclamations. ZSL's construction of their cultural role in environmental risk is laid out In their 'climate change position statement' claiming a state of crisis, requiring immediate action and social intervention.

Figure 13: ZSL climate change position statement



Climate change position statement

After reviewing the best available science, ZSL supports the conclusion that current levels of atmospheric carbon dioxide (CO_2) have very likely exceeded their safe planetary boundary and risk forcing the planet's climate system into a chaotic transitional state.

The consequences include extensive loss of sea ice, ice-sheets and mountain glaciers with resultant dangerous sea level rise; thawing and release of frozen carbon and methane hydrates; ocean acidification; shifting climate zones; extreme weather events and mass biodiversity loss. The socioeconomic and wider consequences for humanity are severe. The uncertainties in climate science are acknowledged, however there is greater understanding and agreement around the key scientific issues than is generally appreciated. This includes the role that climate system inertia plays in masking the true impact of current CO_2 levels. By the time these impacts become evident it will be too late to avoid them or the amplifying feedbacks they will generate. ZSL therefore calls on world leaders to agree and implement policies to restore Earth's energy balance by curtailing further growth of CO_2 emissions and returning atmospheric CO_2 concentrations to below 350 parts per million (ppm) while it is still possible to do so.

Essential actions for achieving this are the phasing out of coal emissions by 2030; avoiding emissions from oil shale, tar sands and other unconventional fossil fuels; reversing the destruction of natural habitats and the negative net impact of agricultural practices. It is still possible to retain a relatively safe climate state but only if we act in time.

ZSL is addressing the global warming threat by working to reduce our organisation's carbon footprint; undertaking research to inform policy; raising awareness and implementing conservation activities to help mitigate and adapt to climate change impacts.

Ralph Armond
Director General, ZSL

The statement begins as a 'doom scenario' (Waswa, Kilalo and Mwasaru, 2014), framing of the environment as the affects of increased carbon dioxide 'risk forcing the planet's climate system into a chaotic transitional state', establishing space for publics to engage with environmental crisis discourse. Reinforcing WAZA's statements, ZSL's statement situates their interpretation in 'risk society' discourse, which encourages publics to frame ZSL as an 'essential' actor in addressing environmental issues, including global warming and species conservation. In articulating environmental risk ZSL is positioned as a space for authentic engagement with publics, by demystifying and involving publics in pro-

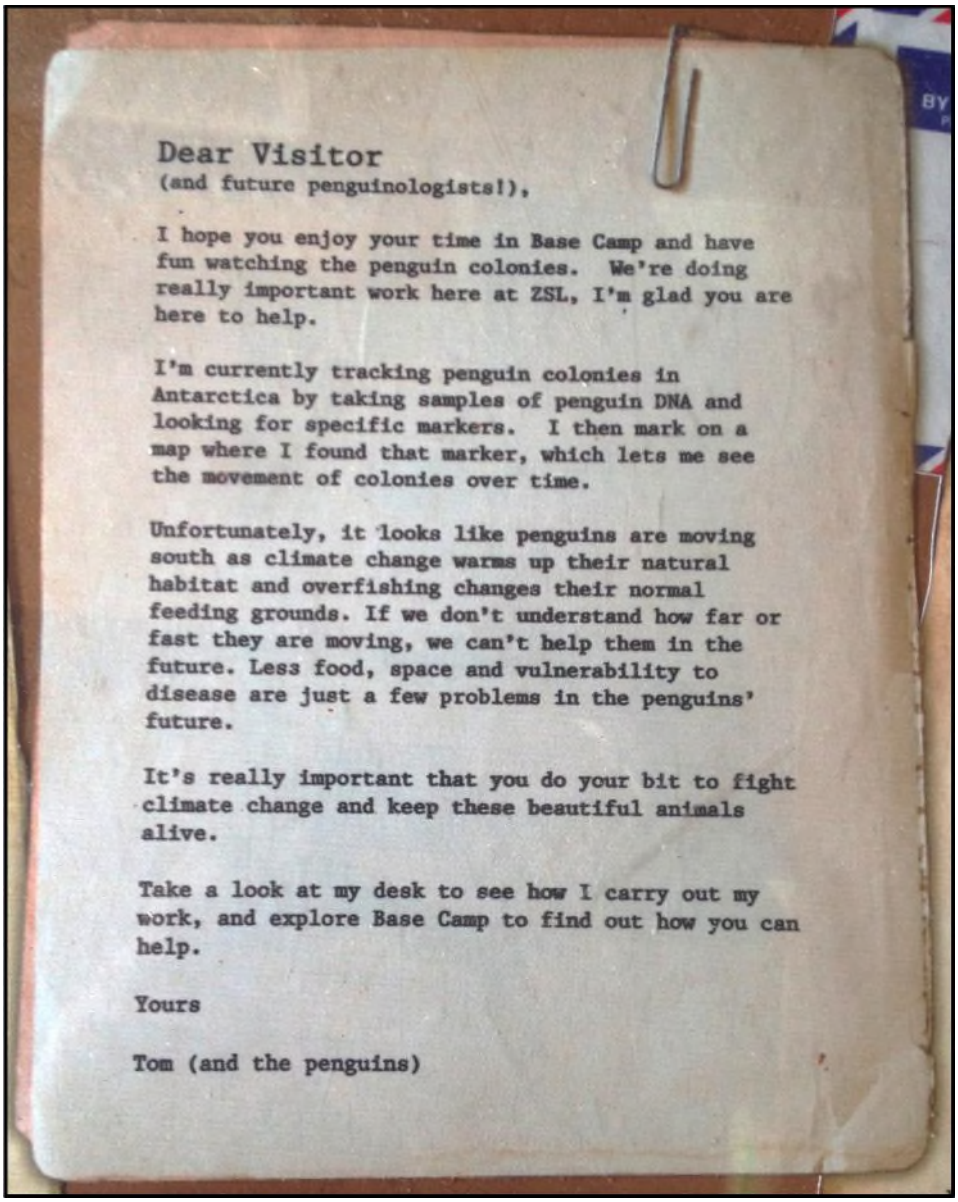
environmental science. Furthermore the choice of risk language, reflecting the doom position of risk society, is reflected throughout Penguin Beach's interpretation, discussed in next section.

4.2.1.2. Environmental Risk Discourse in Penguin Beach Interpretation

The cultural construct of zoos is both a physical and social space where publics are exposed to a number of designed elements, which they make meaning through their own prior experiences. Equally, zoos design these elements in light of their prior experiences and environmental society's values. A common feature of a modern zoo's physical space is interpretive panels.

Interpretative panels, including those at ZSL, often include environmental messages, namely issues of climate change, sustainability and conservation. Penguin Beach interpretive panels clearly embody institutional discourses of risk and environmental crisis. In the penguin exhibit, visitors are exposed to environmental crisis messages in the 'Base Camp' and during Penguin Talks. ZSL mediate the penguins through interpretive panels embodying pro-environmental behaviours. The following interpretive piece, a key feature in the 'Base Camp', frames the survival of penguins on the behaviour of the visitor:

Figure 14: Interpretive “Letter” from Tom Hart



Dear Visitor
(and future penguinologists!),

I hope you enjoy your time in Base Camp and have fun watching the penguin colonies. We're doing really important work here at ZSL, I'm glad you are here to help.

I'm currently tracking penguin colonies in Antarctica by taking samples of penguin DNA and looking for specific markers. I then mark on a map where I found that marker, which lets me see the movement of colonies over time.

Unfortunately, it looks like penguins are moving south as climate change warms up their natural habitat and overfishing changes their normal feeding grounds. If we don't understand how far or fast they are moving, we can't help them in the future. Less food, space and vulnerability to disease are just a few problems in the penguins' future.

It's really important that you do your bit to fight climate change and keep these beautiful animals alive.

Take a look at my desk to see how I carry out my work, and explore Base Camp to find out how you can help.

Yours

Tom (and the penguins)

There are two distinctive discourses of risk in Tom’s ‘letter’. The first half of the letter reflects ZSL’s aim to educate visitors, taking the approach of telling an informative story. The initial risk discourse problematizes the survival of the species in Antarctica. Following this initial risk narrative, Tom places the responsibility of

avoiding irreversible environmental crisis with the visitors. This is a typical approach in species loss narratives.

Building on the above narrative, the pro-environmental behaviour interpretive posters emphasise the threats of human behaviour and encourage the visitor to make changes to their behaviour. Two posters framed each environmental concern; the first explained the environmental concern:

Figure 15: Penguin Beach Base Camp Interpretive Poster "Penguins Hate Climate Change"

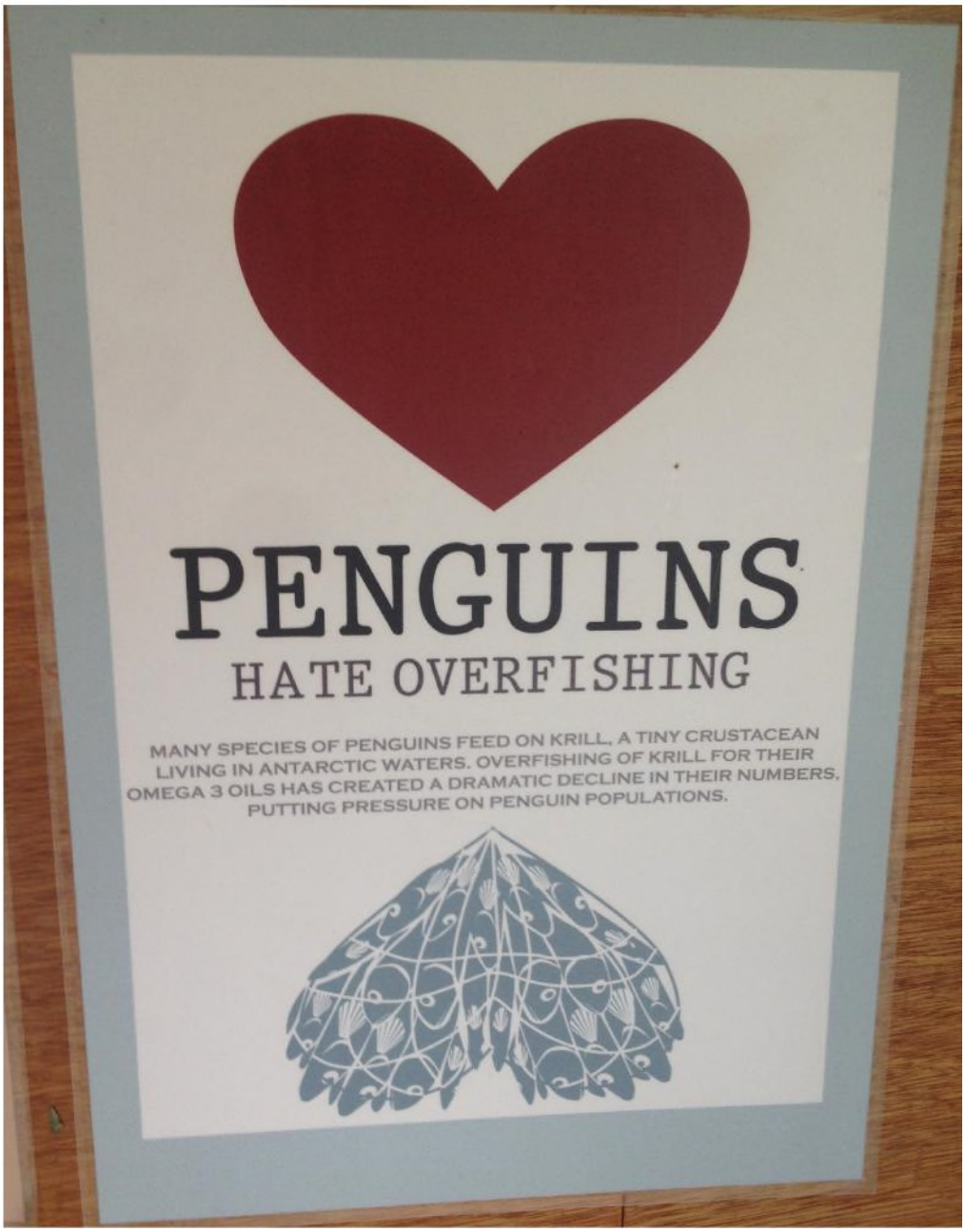
Directly below this informative poster existed a second interpretive poster describing pro-environmental actions visitors could take to help penguins avoid the risk of climate change effects:

Figure 16: Penguin Beach Base Camp Interpretive Poster "Penguins Need You!"

The environmental catastrophe language, identified in the two posters above, fulfils one half of the pattern evident in the Base Camp posters. The second half of the pattern is fulfilled by pro-environmental behaviour prompts. Behaviour prompts are each framed as an antecedent to the ultimate species-loss catastrophe (Lallier, 2012). The two posters balance negative risk catastrophe and positive pro-

environmental behaviour prompts. This finding is in line with Saunders' (2012) observation that the norm of interpretation alienates zoo visitors, focusing too often on issues not directly connected to visitors' interests. For instance, the second set of Base Camp posters discusses the crisis of overfishing:

Figure 17: Penguin Beach Base Camp Interpretive Poster "Penguins Hate Overfishing!"



The above poster sets the crisis of overfishing, framing the issue as having a direct impact on penguins due to consumer demand for omega 3 oils. The poster is paired with a 'Missing Krill' poster, urging visitors to give up using Omega 3 Oils.

Figure 18: Penguin Beach Base Camp Interpretive Poster "Missing Krill"

Employing simple, clearly defined prompts in the posters are aimed to encourage behaviour change. Yet, the prompts are unlikely to be successful on their own. The prompts in these interpretive panels place the blame of conservation crisis with the visitor. By blaming visitors, the messages can 'instantly captivate or alienate audiences' (Saunders, 2012, p. 65). Saunders suggests messages should be inverted. Designs of interpretives can either hold visitors accountable for environmental crisis and the degradation of environment, or can encourage visitors to change behaviours to improve their own cultural position. The effects of these pro-environmental messages add to the construction of the participants' experience.

4.3. Risk in Penguin Encounter

The previous section discusses organisational risk discourse, for which all ZSL London Zoo visitors would become exposed to during their visit. In this section, I specifically review the risk discourses and participation in risky behaviour of Penguin Encounter participants. Penguin Encounter participants are directly exposed to a different type of risk. Participants are able to feed the penguins, which, according to some researchers, is a risk behaviour (Bell, 2012). According to Bell (2012), risk behaviour is participating in an action that contains a hazard; in doing so the participants put themselves at risk of being injured.

As discussed in the Introduction, zoos fill a role in the communication of environmental science by exposing publics to environmental issues using animal's to evoke interest. In this scenario, penguins represent an attitude object, by which

participants can frame their positive or negative environmental attitudes (Prokop and Tunnicliffe, 2008). Environmental degradation, including climate change and species loss, threatens the current state of human existence. Despite the threats, few studies have demonstrated what mechanisms are most successful in encouraging publics to prioritise environmental concerns as personal risks. Building on previous studies that identify direct experiences as a major influence on risk perception and actions, penguin encounters are explored for their potential to offer direct interactions with penguins. Direct experience acts as a major influence on risk perception, learning and action of participants (Forner et al., 2000; Chawla, 1999; Semper, 1990). Drawing on such evidence, the findings in this section reinforce previous research stating direct experience (e.g. petting the penguins, being bitten by the penguins) influences the creation of strong attitudes.

By providing participants with an opportunity to directly interact with penguins, ZSL sought to create opportunities for participants to bond with penguins. This process ultimately anticipated the development of emotional bonds with penguins would lead to a sense of empathy for penguins and responsibility to protect their habitat. This penguin-bond intervention model is grounded in Walsh's (2009) human–animal attachment theory of pro-social behaviour that conceptualizes animal interactions as occurring within a dynamic environment that directly and indirectly influences pro-social behaviours of the human counterpart, including taking responsibility for the animal. However, a number of other concerns develop from the interaction between participants, penguins and zookeepers,

specifically concerns of risky behaviour (e.g. touching a penguin). This section now explores the social interactions of participants in the penguin encounters, ultimately examining how risk dialogue and risky behaviours influence the environmental attitudes of participants.

4.3.1. Danger of Human-Animal Interactions

Unlike the discussion of global risks, the risks participants were exposed to during the penguin encounter did not threaten the existence of the participants. It could be argued the encounter is not a true risk, by partaking in an encounter participants do exhibit a form of risky behaviour, in which they are exposed to the potential for harm, as are the animals. Interactions with animals in the penguin encounters are voluntary experiences. Participants all chose to visit the zoo and to enter the penguin enclosure. Prior to the encounter, participants all were aware of the potential for penguins to bite them, or to potentially come to other harm by entering the enclosure (e.g. slipping on wet surfaces, falling into the penguin pool). Nevertheless, none of the participants expressed concern before participating in the encounter.

4.3.1.1. Risk Perceptions of Lay Participants and Expert Zookeepers

As discussed in Chapter 3, zookeepers serve as gatekeepers of the penguin encounter, positioning themselves as experts in relation to the participants. In doing so, zookeepers are ultimately responsible for mitigating risky behaviours during the encounters. As discussed by Bell (2012), the position of zookeepers as

experts suggests they are trustworthy facilitators of risk, encouraging participants to partake in risky behaviour. Therefore, following Nancy's self-portrayal as 'expert zookeeper' (See Chapter 3), she is in a position to mediate participants' perceptions of the potential risk of engaging with Pickle the penguin:

Extract 48

> Nancy: [Pickle] prefers to sit there, he always sits there. [Talking to Pickle] Where are you going? Are you going to say hi?
> Elizabeth: Can we stroke [Pickle]?
> Nancy: Uhhh [long pause] what you can do is one by one only - not all of you together - he can bite - just so you know - he has got a razor sharp beak. So if any of you are uncomfortable with that, I wouldn't recommend it. But what you can do is give him a gentle stroke on his belly like this, okay? If he does try to bite, don't continue to stroke him again - because that would be encouraging it. Okay?
> Nancy: [Pickle calls] Oh, baby! [To visitors] Oh, yeah sorry. Okay - anyone? I'm going to stand here with you, just in case.
> (Elizabeth and Megan, 03 Sept. 2013, London Zoo, During the Visit)

Video observations of the scene suggest Pickle was not a source of serious harm to the participants. Indeed, during this encounter Pickle is not observed biting, rather preening participants. Unsurprisingly, Elizabeth and Megan disregard their observations of Pickle's behaviour, expressing their scepticism of interacting with Pickle and standing at a distance:

Extract 49

> Elizabeth: I'm scared he's going to bite me.
> Nancy: Oh yeah, he's biting.
> Nancy: [To adult visitor] Do you want to come and stroke him? I'll stand here with you.
> Elizabeth: I don't want him to bite me
> (Elizabeth and Megan, 03 Sept. 2013, London Zoo, During the Visit)

In contrast, an extract from Amy's dialogue is inconsistent with Nancy's portrayal of Pickle, presenting Pickle as non-threatening:

Extract 50

> Amy: You have one or two of the Humboldts that we hand reared last year that are quite calm, like Pickle. He's almost always in here. You can be guaranteed he's in here in the morning.
> (Amy, 02 September 2013, London Zoo)

Alternatively, Pete's depiction of Pickle reflects both Amy and Nancy's portrayals of his threat to participants:

Extract 51

> Pete: There's pickle, she likes just a bit of fuss.
> Visitor: She's a smaller one
> Pete: Pickle was one of the hand-reared penguins. She can be...it took her awhile to get used to me, but now she comes and flirts with me. She just kinda likes me in that way [...] but she never comes in for the meet and greets. It's only like right at the very first thing in the morning or right before you leave at night
> (Pete, 07 September 2013, London Zoo)

Although Nancy may be well intentioned, she deviated from what the other zookeepers may describe as a more accurate risk assessment of engaging with Pickle (Burgman, 2005). Nancy's assessment of Pickle's potential danger to the laypersons may be overly cautious, introducing a higher sense of threat within her programme. Her strong attachment to Pickle is a clear barrier to her facilitation of developing a participant-animal bond. Nancy's portrayal of Pickle underlines a phenomenon I identify as a key factor in the penguin encounter. Based on Hosey

and Melfi's (2010) research of zookeeper and animal bonds, zookeepers are likely to develop strong attachments to the animals in their care, and exhibit positive protective attitudes on the care of said animals. Combined with participants' prior exposure to risk discourse, Nancy's portrayal of Pickle has the potential to disrupt participants' development of positive environmental attitudes and pro-environment behaviours.

4.3.1.2. Choice and Adverse Risk Language

During the penguin encounter, both the participant and the penguin are given the 'choice' to participate in the interaction. Their choice to participate is what Bell calls a perceived choice; they are not wilfully exposed to risk. That is to say, the participants are not put in a situation were they will deliberately be at risk of serious harm or death. According to M. Bell (2012) people are "far more likely to accept a risk if they perceive it as voluntary" (p.233). The present data suggests that this voluntary acceptance of risky behaviours may influence the myriad of interactions during the encounter as well as the impact of the encounter on participant attitudes and perceptions of animal risk.

In the case of the penguin encounters, participants are introduced to the threat of penguins by the zookeepers before entering the enclosure. Zookeepers were observed framing this risky behaviour in one of two fashions. In the following extract Nancy (Extract 52) presents the penguin encounter as risk intense.

Extract 52

Nancy: Hello, so what we're going to do come in here. Just around the rocks, we don't go anywhere else. This is the only area that is zoned for us people and penguins as well. If a penguin comes in then you can get up close and personal, depending on what penguin it is, they all have different personalities. Some can be more aggressive than others. So, I'm going to let you know whether you can stroke them or not. Shh, this one is in the way, so if you could go around while I hold him back. He's not getting it. So obviously, we are leaving it up to the animals whether they want to come in come into the area or not. We don't force our animals to do anything they don't want to do here. So, we'll see if they want to come over. Ahh, if they do come in just obviously be aware of the fact that these animals have really sharp beaks, so try not to put your face anywhere near their beaks. some of them can get crabby, so if at any point during the encounter you become uncomfortable just let me know and I'll let you into this area [exit]. Where you will be away from the pointy beaks but you can still see what is going on. Okay?

(Elizabeth and Megan, 03 Sept. 2013, London Zoo, During the Visit)

As illustrated in the above extract, Nancy amplifies the choice of penguins to participate in the encounter, over the choice of the participants. By doing so, Nancy creates a higher sense of perceived risk by the participants (e.g. Extract 49). Nancy compounds the sense of risk by using language suggesting it is highly risky to engage with the penguins (e.g. aggressive, sharp, pointy). If, indeed, touch is an essential aspect of human-animal bonds (Beck and Katcher, 1996), Nancy's use of language discourages touch. In contrast, Amy's introduction to the penguins uses less adverse language.

Extract 53

Amy: Hello, I'm [Amy]. If you could just come this way. I've just got a couple points for health and safety. So, first off, this is my first one on my own. If we just stay inside these rocked areas, um we can't guarantee that you can touch a penguin, but luckily Ricky is in today, so we should be able to do it. Um,

> obviously they can bite, so keep your faces away - that's most important. If any of the others come in, I can let you know if I think they are biters or not, but you should be able to stroke a few of them if they come in. Um, so we'll go in. Oh, when we go in if you just stay as low as possible to the ground, so if you just sit down, crouch down - then you're less intimidating to them. Um, if they do - some of them like to chase things - stay still then they're less likely to bite, cause it's less of a game to them.
>
> (Illona and Cameron, 02 Sept. 2013, London Zoo, During the Visit)

The language in Amy's introduction suggests participants have more control over their interaction with the penguins. She frames the participants as being threatening to the penguins. Equally, she warns participants the penguins can be a threat if they chose to invade the penguins' space. By framing the threats to both the participants and the penguins in this manner, Amy suggests the participant has voluntary choice in participating in risky behaviour, thus encouraging her participants to participate in this risky behaviour.

Yet, another comparison of Amy and Nancy's introductions demonstrate one additional key difference in the introduction of the penguins. Zookeepers are expected to be an authority on penguins and the environment, the notion that the zookeeper may not understand the risk is concerning for participant interaction. A study by Campbell (2002) examined the attitudes of over 50 experts in conservation and management of marine turtles. The results of the study found experts who were uncertain of the outcome were significantly more cautious of exposing themselves, or their stakeholders, to risk (Campbell, 2002). Applying Campbell's findings to this research, Amy's performance in the encounter reveals her inexperience in facilitating penguin-participant encounters. Her tendency to

suggest participants do not engage with certain penguins due to the potential threat they pose increases the participant's perception of risk.

Extract 54

Amy: Come on, come on [Ricky slowly comes over]
Amy: So feel free to....
Cameron: Are we allowed to touch him? [...]
Amy: Um, keep - he does bite sometimes, but...
Visitors: [nervous laugh]
Cameron: I bet he does
Amy: ...but he has a blunt beak, so it's more like a pinch
Illona: Hello [talking to Ricky]
Amy: If he gets a tiny little bit of skin it does hurt.
Cameron: He's nice to touch
Amy: This is one of our Humboldts. I don't know him.
Illona: Laughs
Amy: Ricky will tell him off in a minute
Illona: [laughs] Hello!
Cameron: [laughs]
Amy: Watch she does bite.
Cameron: Oh, right great.
Amy: Ok [moves Humboldt penguin away]
Amy: She's a very playful penguin this one. She's very inquisitive. She's not very tame. So, I wouldn't try and stroke her.
Cameron: Oh good to know
Illona: Right?
(Illona and Cameron, 02 Sept. 2013, London Zoo, During the Visit)

In the extract above, Amy's language is not necessarily risk averse. She guides the participants to interact with one less threatening penguin (Ricky), rather than one she believes may pose a threat to the participants. By encouraging participants to touch Ricky, she trivializes his biting behaviour in comparison to an lesser known penguin. In response, both Cameron and Illona find the penguins present a bigger threat than perceived before entering the enclosure.

Ultimately, Ricky is observed attempting to nip Illona several times. Cameron and Illona discuss their trepidation of further interaction with the penguins, at which point both participants move away from the immediate reach of Ricky:

Extract 55

Illona: [talking to Ricky, as she attempts to touch him] Oh no! You don't like it
Cameron: He's warned you before.
Illona: I know but its so fluffy.
Cameron: [laughs]
Illona: I'm not going to tough his belly, it'll bite me.
(Illona and Cameron, 02 Sept. 2013, London Zoo, During the Visit)

Interestingly, this extract is taken from a point in the encounter when Illona and Cameron where standing away from the other 4 participants and the zookeeper. Illona and Cameron embody Amy's fear of engaging with the penguins, refusing to touch Ricky, due to the threat he poses.

In addressing the question, '*How do zookeepers portray penguins as a source of risk during the Penguin Encounter?*' these results above have provided evidence zookeepers and participants' discourse of risk fluctuates as a result of their prior experiences, ultimately influencing participants' involvement in the Encounter. I now turn to explore the influences of risk perceptions on participants' conceptualisation of penguins, the environment and pro-environmental behaviours.

4.3.2. Penguin Encounter Influences on Risk Perceptions

The patterns of risk perception identified in this second section echo some of Edwards and Elwyn (2001) findings regarding the use of risk language. Edwards and Elwyn (2001) argue risk language used by experts significantly influences the attitudes of publics, impacting their ability to make decisions. The implication of risk language, on participants' attitudes, becomes apparent in participants' post assessment of the needs of penguins. In this subsection, I discuss two examples of risk discourse in during the encounter and the implications of varying risk language during the encounter.

4.3.2.1. Charlie and Susan

Some of the participant data show they arrived at the encounter with pro-environmental attitudes and knowledge. Certainly, most participants had attended a wildlife park, zoo or other animal encounter, as well as watched a number of penguin films and television shows. For example, two participants in this study, Charlie and Susan owned pets, had visited zoos and wildlife parks worldwide and regularly watched animal documentaries. Their pre-visit interview indicated being pro-environment: they each felt the environment needed cared for by people, and felt animals were deserving of respect by humans. These views can be seen in the example extract below. Susan constructs penguins as a part of the natural environment, needing to be cared for by people, while Charlie, who doesn't originally connect the needs of penguins with needs of the environment, soon agrees with Susan's construct of needing to care for the environment:

Extract 56

Researcher: Do penguins need to be cared for by people?
Charlie: I put 2, because wild penguins do not need to be looked after by people. They are perfectly capable of looking after themselves but in captivity obviously they need to be looked after by people. Cause they are in captivity, that's why they are there, so people are responsible for them.
Susan: I put 5, because in captivity yes they need to be looked after because we are their source of food and excetra and I also think that *in the wild we kinda need to care for them in a way that we should look after the world and the enironment*.
Charlie: Oh! I didn't think of that part
Susan: We should make sure the environment stays like it should be.
Charlie: I think it thought too much literally about the penguin. but *yes caring for the enviornment*.
(Susan and Charlie, 05 Sept. 2013, London Zoo, Before the Visit, emphasis added)

In their discussion, Susan and Charlie negotiate the need for captive penguins to be cared for in comparison to needing to care for wild penguins. These discourses of 'caring for penguins' provide an interesting point of discussion. Situating this discourse in Vining's argument that research can not explain 'whether caring for individual animals translates to caring about species, [nor] that caring for species leads to caring for ecosystems' (2003, p. 96), we cannot assume Charlie and Susan exhibit behaviours of caring for ecosystems simply because they care for animals. Yet, if human-animal bonds are an indicator of pro-environmental attitudes and behaviours, the scope for the Penguin Encounter to positively foster Susan and Charlie's empathy and pro-environment attitudes is reduced.

As can be seen in the following extract, Amy introduces Susan and Charlie to the penguins using moderate risk language:

Extract 57

Amy: You can put your hand here and give [Ricky] a bit of a touch. He will have a bit of a nibble.
Susan: That's okay.
Amy: but it's not very sharp. He can scratch but he is quite placid. So, if you tend to stroke him on the belly.
Charlie: [stroking Ricky] [quiet giggle]
Amy: He's quite [unaudible]. He'll preen the hairs on your arm or on your clothing.
Susan: Like that.
Amy: Whether its clothing or hairs, it'll be fine. Anyone else? You want to take turns having a go? Ricky is quite chilled out. [To other female visitor] do you want to have a go?
(Susan and Charlie, 05 Sept. 2013, London Zoo, During the Visit)

Amy's use of balanced language in this extract conveys to the participants' Ricky's potential for harm, whilst also suggesting to participants their interaction with him will not put them at risk. Amy's dialogue sets the tone of the interaction as a relaxed, and socially beneficial to both the participants and the penguin. The pattern of Amy's word choice during the encounter is balanced even when discussing the hunting tactics of penguins:

Extract 58

Amy: You can't see it, but inside the mouth they have an extra set of grooves, which helps it have an extra form of grip. It helps [Ricky] hunt fish out in the wild. It's moving around, it's wriggly, slimmy. So, it's just an form of assistance. The Humboldts, if they you look at their top beak, its quite hooked at the end and much flatter. [Ricky's] is kinda more pointed, theirs is flat, hooked and sharp.
(Susan and Charlie, 05 Sept. 2013, London Zoo, During the Visit)

The idea of risk and risky behaviours introduced during this encounter were incorporated into participants' understanding and attitudes towards the penguins.

Indeed, the following extract from Susan and Charlie's post-visit interview demonstrate a significant shift in their agreement to the statement of needing to care for penguins:

Extract 59

Susan: Six. I think they don't neccessarily need our care out in the wild, apart from environmentally. but obviously if they are in captivity they rely on us.

Charlie: I put 6 as well, because their habitat and envionment needs help to keep it um the same for them but the penguins themselves don't need to be looked after by humans unless they are in captivity. In that case they do.

(Susan and Charlie, 05 Sept. 2013, London Zoo, During the Visit)

In this case, Susan and Charlie both express their pro-environmental concern, with substantial increases in their agreement to the statement, 'Penguins need cared for by people'. Although their explanation is maintained almost exactly in terms of the why penguins need cared for by people, the significant change to their ratings is indicative of a subconscious change in participants' empathy for the penguins (Leatham, 2006). Yet, even with the low level of risk discourse, Susan and Charlie do not change their belief that penguins shouldn't be kept in domestic environments, indicating the penguins may not have felt uncomfortable with humans being in the enclosure:

Extract 60

Charlie: I still don't think they would be good pets. They still should be wild if possible.

Susan: Yeah, I put one as well, because, yeah some of them might just, some of them liked being stroked and things but they do give you a peck.

Charlie: They still tried to move away sometimes.

Susan: Yeah, they were like leave me alone a bit like how people would.
(Susan and Charlie, 05 Sept. 2013, London Zoo, Before the Visit)

Importantly these discussions highlight an underlining aspect of participants' attitudes of the danger of keeping exotic animals in their homes. Zoos have largely supported the regulation of private ownership of exotic species for fear of the risk exotic species possess, as much as private ownership also presents a risk to animal conservation (Nyhus et. al., 2003). Despite believing penguins would present a risk in their home, both Susan and Charlie marked the penguins as being happy in the zoo, than they had done prior to the encounter. The implication of these two measures indicates participants recognise the risky behaviour of interacting with penguins, but have a greater appreciation for environmental guardianship. I now go on to analyse a different delivery of risk discourse.

4.3.2.2. Megan and Elizabeth

As the least involved in pro-environmental behaviours, Megan and Elizabeth were more seemingly the most susceptible to influence from the Penguin Encounter zookeepers. Both had visited zoos previously, but had not had a direct encounter with a non-domestic animal. Leading their encounter was Nancy, previously discussed in Section 4.3.1, who's discourse during the encounter embodied an extreme of risk potential. Nevertheless, Nancy was the penguin expert in Megan and Elizabeth's encounter. Having not participated in a similar experience previously, they had to place themselves in the care of Nancy, trusting Nancy's judgement of behaviour that would be considered too risky. Thus

zookeepers, as experts framing animals' behaviour, hold enormous power in participants' construction of risk.

Nancy's influence in Megan and Elizabeth's conceptualisation of needing to care for penguins is apparent in the excerpts below. Prior to visiting Megan and Elizabeth give typical responses to the question. Neither considers pro-environmental actions a necessity. In actuality, both girls believe wild penguins are self-sufficient – existing separately from human action.

Extract 61

Megan: I put two, because they are more than capable of living on their own out in the wild, but like say like if they are in a zoo then they are going to need like help with being fed.

Megan: Um, if they lived anywhere like in the wild, where do they live? The north pole or the south? One of those. Then they are more than capable of living on their own. Unless they are going extinct, but i don't really think they are endangered.

Elizabeth: I put 4 because if they are in a zoo then they need caring for because they've got nothing, it's their natural instinct to find food and stuff. So, they could probably do it themselves if they were in the wild and they had never been helped out before.

(Megan and Elizabeth, 03 Sept. 2013, London Zoo, Before the Visit)

From pre-visit to post-visit, Elizabeth expressed one of the most dramatic changes in 'caring for penguins'. Indeed, Elizabeth and Megan's compassion for the penguins and the environment seems diminished following the encounter:

Extract 62

Megan: Two. They don't need people to help care for them in nature. They can get on by themselves.

Elizabeth: I put 2 because the wild ones don't have help, but the ones at the zoo need looked after. So, yeah.

(Megan and Elizabeth, 03 Sept. 2013, London Zoo, After the Visit)

The extract above shows that before taking part in the Penguin Encounter as part of this research, Megan and Elizabeth were reluctant to consider eating a penguin. Following their encounter, each participant felt they would only eat a penguin if their own welfare were at stake:

Extract 63

Researcher: If you were hungry would it be okay to eat a penguin?
Megan: I put 4, you shouldn't eat it just if your hungry, but say for example you are like starving and there is no food source, then like its fine then.
Researcher: So, you would eat them if you were starving and didn't have any other food?
Megan: Yeah, if it was a matter of life or death then i would eat a penguin. under any other circumstance then no i wouldn't
Elizabeth: I put 5 because if you are hungry then no you don't, but if you were starving then probably because they are not really different to like pigs and sheep and stuff. They're just like really the same. They are just an animal as well. So, if you were starving then...yeah
(Megan and Elizabeth, 03 Sept. 2013, London Zoo, Before the Visit)

Despite her positive propensity for conserving animals, following Elizabeth and Megan's visit they seemed less concerned about conserving species:

Extract 64

Megan: I put 7. Well, like before. If I was starving then i would eat a penguin. If you're going to die then you might as well eat it.
Elizabeth: Six, yeah well yeah like the same. If I needed to I would.
(Megan and Elizabeth, 03 Sept. 2013, London Zoo, After the Visit)

The above extract demonstrates that the positive valuing of the penguins was not absolute; Elizabeth showed a clear shift in her thinking about the value of

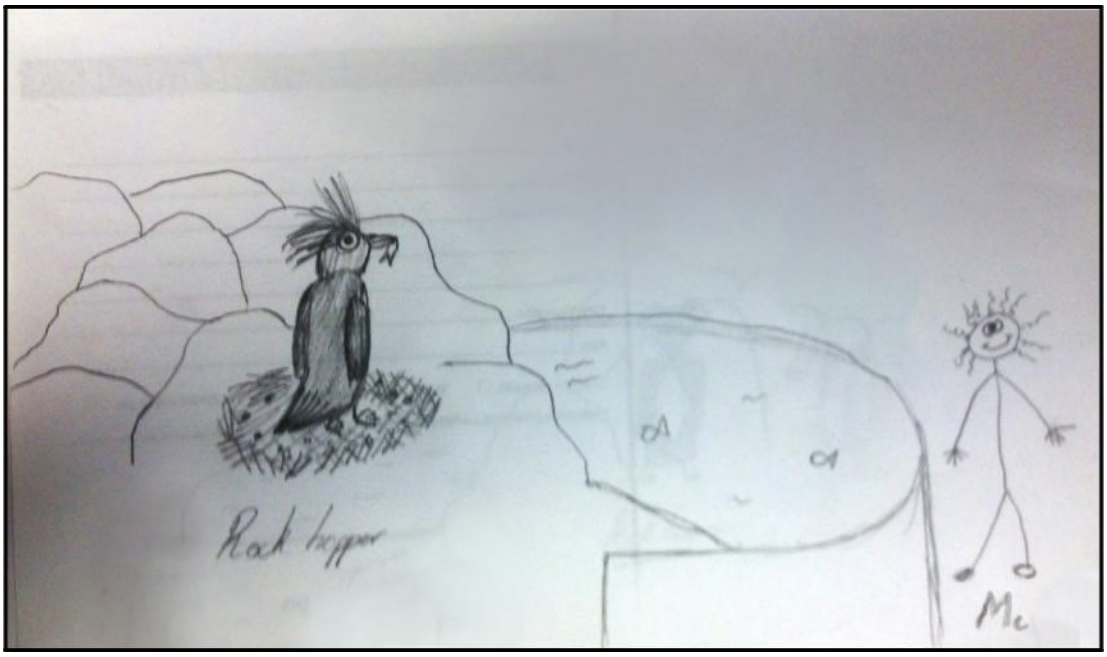
penguins as a result of a single Penguin Encounter session. Herzog (2011), anthro-zoologist, describes several aspects of human-animal relationships, which demonstrate humans' values, attitudes and practices concerning animals are strongly embedded in cultural norms and experiences. The de-valuing of penguins is important for understanding attitude changes and perceptions of risk. As the bond between participants and penguins is broken, or fails to develop, participants are more likely to distance themselves, ultimately de-valuing penguins as worthy of human attention. Penguin-participant bonds shifted from beginning to end of the encounter, as captured both by video evidence and through the penguin drawings. Drawings evidence participants undergo a shift to their comfort with penguins:

Figure 19: Megan's Pre-Visit Drawing

In the above drawing, the participant and penguin are in close proximity to each other, sharing a physical space, with no barriers between the two. Following

the encounter Elizabeth distances herself and the penguin, separating her and the penguin by space and physical barriers:

Figure 20: Megan's Post-Visit Drawing



While the drawings do show scientific and environmental knowledge gain[2], the post-visit drawing above gives clues about Megan's bond with the penguins.

[2] In the comparison of these two drawings Ricky's features are accurately detailed and his nest is added in with appropriate detail.

The dramatic shift in Megan's proximity to the penguins, as well as the introduction of a barrier, indicate Megan visualises the penguins as a potential source of danger. This finding is in line with Franklin's (2012, p. 43) argument that zoos have historically acted as a cultural institution to house dangerous species behind bars.

From a human-animal interaction perspective, physical dissociation between the participant and the penguins is important for understanding how attitude change takes place. Therefore, a substantial shift in participants' depiction of cohesion and distancing could be argued as a distinctive and important aspect of building pro-environmental attitudes and behaviours. Megan's drawings are a primary example of the potential influence of risk discourse arising from Penguin Encounters.

4.3.2.3. Chelsea and Diane

One phenomenon of the penguin encounter was the lack of environmental science discussion, certainly on the topic of environmental preservation. Participants typically sought knowledge of penguin behaviour and not of the environmental status of the penguins. Ultimately, participants' seemingly disinterest in learning about environmental disaster lead to little environmental science information being provided by the zookeepers. Indeed, only one of the penguin-encounters contained environmental preservation dialogue.

In Diane and Chelsea's encounter, Pete discussed aspects of ZSL conservation strategies. Pete's interpretation strategy employed simplified risky

behaviour language, opting instead to discuss wide-reaching environmental risks (i.e. over-fishing). The influence of this strategy is illustrated in Diane and Chelsea's description of human's need to care for penguins. Prior to visiting, both participants focused specifically on caring for penguins in a captive environment:

Extract 65

Researcher: Penguins need to be cared for by humans.
Diane: Two. I agree. if They are kept in a zoo, then yes.
Chelsea: No
Diane: If they are in the wild and they've got their own habitat and stuff like that and the older penguins to teach them and look after them. Then I would say no but I would say maybe they need to monitored in the wild rather than looked after.
Researcher: Okay
Chelsea: I go to put no.
Researcher: Did you put a number down?
Chelsea: Yeah, one
(Diane and Chelea, 27 August 2013, London Zoo, Before the Visit)

Post-visit, Chelsea's perceived value of 'caring for animals' transitions to caring for penguins and their environment. In addition, Chelsea explores the human dimension of environmental crisis, highlighting public's responsibility for conserving 'nature' to foster penguin conservation.

Extract 66

Researcher: Okay, so then do you think penguins need to be looked after by people?
Chelsea: I've put six for that one. I still don't think penguins themselves need looking after.
Diane: Four. Yeah, they can pretty much look after themselves unless we take them out of their natural environment. Then we have to feed them.
Chelsea: Like the environment and such. If obviously we trash that and stuff they're not going to survive because we are going to steal their fish. You're taking away how they are surviving. You're

going to force them to have to try to learn new ways to survive, but if we weren't doing what we're doing then they'd be fine.
(Diane and Chelea, 27 August 2013, London Zoo, After the Visit)

As exemplified in the data extract above, by not engaging in risky behaviour discourse, Chelsea and Diane appear to have shifted their concern for penguins to incorporate wild penguins. The extracts above offer some evidence of the potential benefits of Pete's contrasting style of delivering the Penguin Encounter, by not engaging participants in risky behaviour discourse. Moreover, the extracts below further exemplify the potential impacts of omitting risky behaviour discourse, including allocating increased value to the penguins.

Extract 67

Researcher: If you were hungry would you eat a penguin?
Diane: No!
Chelsea: Umm, it depends if there was anything else on offer first.
Researcher: Let's say there is nothing left and you are starving..
Chelsea: Oh well, I'm going to say 6 for that.
Diane: I thought you would!
Chelsea: If I'm out in the wild and we're hungry, we're eating
Diane: [laughs]
Chelsea: I might possibly feel very, very guilty - and it might take me about a week...
Diane: [laughs]
Chelsea: ...but we are going to have to eat it. If it was a case of me wasting away and that poor penguin. I would try to do it as nicely as possible.
Researcher: So, Diane you put a one, why did you put a one?
Diane: Um, they're just too cute to eat really.
Chelsea: it goes above cuteness when you're bloody starving.
Diane: [laughs] Yeah, but you wouldn't eat like a dog.
Chelsea: You are in the WILD, and we've had no food for a week.
Diane: [laughing]
Chelsea: ...and we're really starving. We're really wasting away here. It's life or death and you can see a little penguin. Not really doing much - like you said - you are not going to eat the bugger?

Oh, I am. I'll eat it all right in front of you and I'll savor every mouthfull.
Diane: Well, obviously if I was in the situation, it could be a bit different... but I don't...
Chelsea: that's why she's skinny and I'm not.
(Diane and Chelea, 27 August 2013, London Zoo, Before the Visit)

The perceived value of penguins transitions from primarily an object for self-preservation, to holding intrinsic value due to the penguins' likeability (Herzog, 2011; Benton, 2010; Haraway, 2008).

Extract 68

Researcher: If you were hungry would you eat a penguin?
Chelsea: No! I can't eat it anymore
Diane: No, I definitely wouldn't eat a penguin. After today, I'm strictly against eating a penguin
Chelsea: No! (in agreement)
Diane: It's like going to eat my dogs. I wouldn't eat my dog. I couldn't do that!
Chelsea: I couldn't eat it. I would just think of him and laugh.
(Diane and Chelea, 27 August 2013, London Zoo, After the Visit)

The above extracts demonstrate the important role existing cultural norms contribute to valuing species. Self-preservation, and the preservation granted to non-human, is largely dictated by how similar humans envision animals as similar to themselves (Shweder, 1982). Therefore, as participants perceive penguins as similar to themselves, or conversely as a threat to themselves and therefore not similar to themselves, the morality of harming the penguin is questions. These results are similar to arguments by Loughnan, Bastian and Haslam (2014) who suggest "eating animals is morally troublesome when animals are perceived as worthy of moral concern. The more moral concern we afford an entity, the more immoral it

becomes to harm it" (p. 106). Moral influence will often be more important than any fact about a risk of environmental crisis (Herzog, 2011).

Each of Penguin Encounters discussed in this section illustrate the impacts of different discourses and delivery of risk and risky behaviour. Having examined the Penguin Encounters interpretation of risks, I now discuss how encounters with risk are constructed over time.

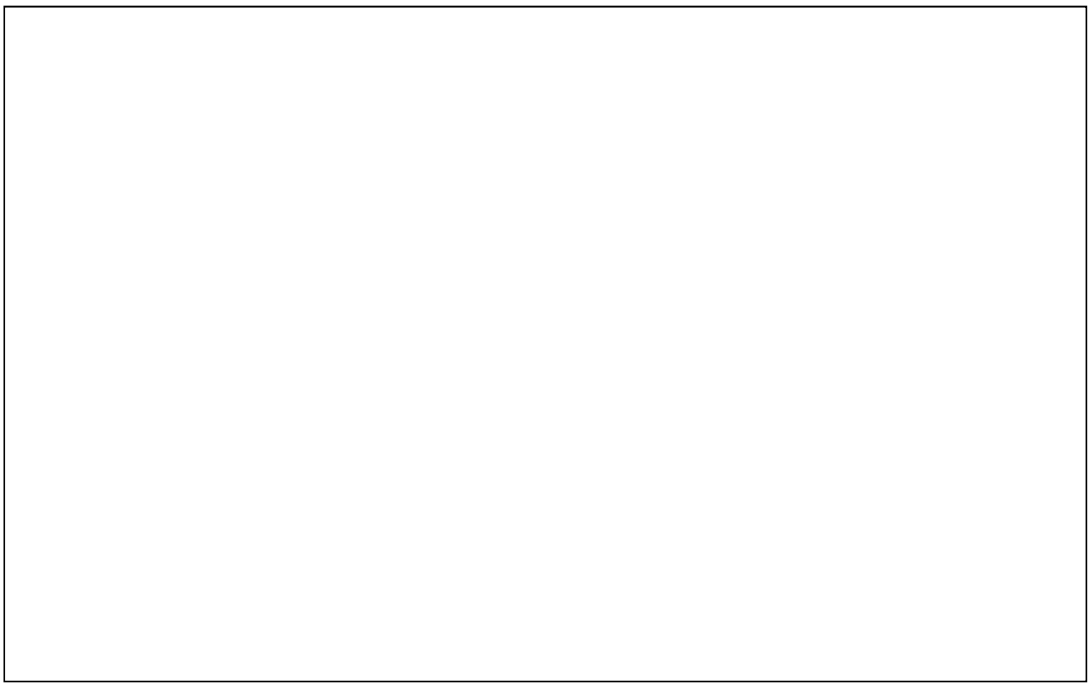
4.4. Trajectory of Participant Risk Construction

This chapter brings together analyses and concepts of dangers of human-animal interaction and environmental crisis to illustrate how risk is discussed and constructed by penguin encounter participants. Living in the risk society, participants had likely encountered risk discourses prior to attending the zoo (e.g. Jensen, 2012; Irwin 2008; Beck, 1992). Risk, and risky behaviour, dominates the dialogue of science education; therefore it is not surprising participants encountered messages of environmental risk, whilst at Penguin Beach and during the encounter. How participants perceive these risk messages has a direct influence on participants' pro-environmental attitudes. By researching the setting, the range of risk discourse and the complex interactions in the encounter, we begin to understand how the trajectory of risk perceptions develops (Jensen and Wagoner, 2014). In diagramming the multifaceted experiences of participants, this analysis has examined how participants made meaning of their experience in light of risk discourse.

While ZSL's, and WAZA's, communication of risk is framed as a global problem, largely ignoring the individual experiences of risk, the Penguin Encounter provides an opportunity to inspect how animal and environmental risk is socially constructed. Participants repeated exposure to (of lack of) environmental risk discourse, and animal interaction risk messages, are reshaped and internalised by participants, becoming part of their worldview and influencing their interpretation of environmental crisis (Dake, 2010). The construction of risk by ZSL, and the public sphere, occurs over time. By reviewing risk language and participants' risky behaviours, this section identifies junctures in risk language. Through identifying junctures of risk these participants follow one of several potential trajectories. Thus, ZSL's ability to influence public perceptions of risk, through animal encounters, is greatly dependent on their choice of risk discourse.

Initially, messages of risk are developed at the organisational level. These risk messages are carried down into ZSL's statements of environmental risk, and ultimately London Zoo's construction of Penguin Beach's interpretation. Participants have the potential to encounter both ZSL's messages of environmental crisis and Penguin Beach's interpretive panels. Indeed, reading (or at least seeming to read the panels) operated as one primary obligatory passage point. Once the Penguin Encounter began, zookeepers' practice of using risk language influenced the definitive trajectory of participants' inclination towards pro-environmental attitudes. The development of and influence of risk language is constructed below.

Figure 21: TEM Model of Risk Perceptions in Penguin Encounters



The development of ZSL's discourse of risk has the potential to shift participant pro-environmental behaviours, as well as their bonds to exotic non-human animals. Certainly, this study has identified themes of risk discourse and it's role in mediating the Penguin Encounter. Risk language and experiences ultimately mediates the encounter, influencing participation in pro-environmental discourse.

4.5. Conclusion

This chapter has looked at how four sites of risk discourse are produced and negotiated within ZSL. Arguing that the framing of environmental risk within zoos arises from the reflexive modernity, prior research constructs zoos as forerunners of environmental crisis intervention. Using document analysis and data from

Penguin Encounter participants, I discuss how ZSL articulation of environmental risk through their encounters has dramatically differing impacts on participants' framing of environment and penguins. By contextualizing the penguin encounter through risk language, and acceptable pro-environmental behaviours, participant attitudes were analysed by their responses to environmental prompts.

I argue if zoos, ultimately hope to encourage pro-environmental attitudes and behaviour by building empathy for the ecosystem through human-animal interactions, programmes need to lessen risky behaviour dialogue. Building on Daly and Morton's (2006) findings, those who maintained strong attachments to their pets are more empathetic to animal matters. In Part 1 of this chapter, institutional discourses of environmental risk were analysed, looking at common themes amongst the highest level statements down through London Zoo's interpretive panels. In the second part of the chapter, Penguin Encounter risk language and its ultimate impacts were analysed. This section extended my discussions in Chapter 2 of the expertise, examining how the influence of expertise defines the portrayal of risk. The fundamental finding from this chapter uncovered patterns of risk language affects. Heightened use of risky behaviour language decreased potential developments of human-animal bonds, amplifying participants' construction of penguins as a source of risk, thus decreasing participants' commitment to pro-environmental attitudes. In contrast, the decrease in risky behaviour language, alongside discussion of pro-environmental messages, leads to increased feelings human-animal bonds and pro-environmental attitudes.

This is the first study of this kind and further research is needed to explore a more detailed construction of public understandings of environmental issues through mediated human-animal interactions. Zoos can play a role in constructing pro-environmental attitudes, if discourses of risk are redrafted.

Chapter 5. Discussion of Findings, Limitations and Contributions to Knowledge

5.1. Introduction

This study contributes to science communication by seeking to understand the public's environmental-related attitudes using a multi-levelled approach. As discussed in the literature review chapter, considerable research has been done on approaches to science communication, including why people engage in science communication, potential influences of visiting organisations with pro-science messages and the benefits derived from participating in science communication activities. Yet little theoretical or empirical research has been done on the interactions between the public, science communication and 'nature' itself in these settings. Prior research in the area has focused primarily on ex-situ, wildlife tourism or on the experiences of publics in *viewing* nature as a proxy for interacting with nature. Studying the gap between these research fields, this study has focused on the influences of direct interactions with captive, ambassador animals in zoos, mediated by zookeepers, investigating the changes in participant's pro-environmental attitudes over the course of the encounter through the unique lens of the Trajectory Equifinality Model.

Research on the cultural effects of interactions between visitors and animals in zoos, or other environmental centres, is less than forthcoming. Previous research focused on creating better learning experiences in zoos, such as the research by Povey and Rios (2002) which explored the proximity of visitors to animals to

determine the relative effectiveness of zoo programmes; although little information was gleaned from this study regarding the development or effects of interactions on pro-environmental attitudes. While other researchers, such as Hosey (2007) and Baker (2004), have carried out research with a specific animal welfare focus. The emphasis in these studies is not on human-animal interactions serving as a mechanism to encourage those who participate to take up pro-environmental stances. The emphasis of this research is to understand how human-animal interactions in zoo programmes affect pro-environmental attitudes. Furthermore, as discussed in the literature review and Chapter 4, the use of science communication in zoos is in competition with concepts of the environment that originate from outside of the zoo. Capturing these pre-conceptions of the environment are necessary in analysing how participant attitudes develop, and to identify patterns of environmental rhetoric.

Findings of the study contribute to the knowledge of environmental sociology, as well as human-animal studies, by establishing a detailed framework for understanding why and how participants come to regard the environment through interactions with penguins. The contributions of this study suggest two key perspectives on science communication: the role of the science expert in communicating environmental science, and theoretical insights into the construction of environmental risk and crisis through human-animal interactions and zoo rhetoric. Furthermore, this study contributes new methodological perspectives for research in science communication, exploring how experiences and

social influences over time guide the pathways of science perceptions. The following sections review the findings and contributions of this study in more detail.

5.2. Discussion of Findings

This research provides a novel approach to the study of sociocultural influences on pro-environmental attitudes, framed through a mediated human-animal encounter. This study involved an in-depth exploration of human-animal interactions and pro-environmental communication through the observation of 10 Penguin Encounter experiences. The findings of this study provide empirical data, and two theoretical TEM models, which highlight two phenomena important to understanding how social influences impact the trajectories of participant dispositions towards pro-environmental attitudes and participation in science discussions. Through analysis of the data arising from this multi-method approach, this study found that ultimately prior experience, certainly those from media, had greater influence on participants' perceptions of expertise and truth in environmental science. However, this study also found the rhetoric employed by zookeepers had a significant influence on the interactions between participants and the penguins, as well as the perceptions of participants.

Several of the research questions set out in this thesis sought to uncover the mechanisms by which participant attitudes, ideas and actions, particularly in relation to the zoos' explicit mission of promoting pro-environmental attitudes and behaviours, were influenced by the Penguin Encounter. Ultimately, two prominent,

influential themes were uncovered: perceptions and displays of expertise and the construction of environmental risk.

The findings of Chapter 3 demonstrate how and why the construction of expertise influenced the participant experience, and ultimately their participation in the Penguin Encounter. This study illustrates how ZSL's expertise is both internally and externally constructed, situated within larger discourses of zoos as experts in conservation science. Results of this analysis demonstrate the perceptions of institutional and cultural expertise participants held. The section then goes on to analyse how perceptions of expertise are formed; in part from their previous experiences, their own perceived expertise and from rhetoric encountered in the exhibit and throughout the Penguin Encounter. Whilst zookeepers may wish to 'distinguish their professional status as animal experts from what they consider the poor judgment of lay audiences' (Grazian, 2015, p. 174), the results indicate the degree by which the zookeeper exerts their expertise can ultimately cause the participant to reject the zookeeper's expertise.

Data presented in Chapter 5 highlights the critical role that risk discourse plays in the development and change of participants' attitudes towards, and interest in, environmental science. I examined how sites of risk discourse are produced and negotiated within the Penguin Encounter. I argue that the way in which environmental risk was framed arises from the notion that zoos, and their visitors, need to reconsider their relationship with nature, thus, establishing acceptable pro-environmental attitudes and behaviours. I further argue that if zoos

hope to encourage pro-environmental attitudes and behaviour by building empathy for the ecosystem through human-animal interactions, programmes need to lessen risky behaviour dialogue. However, despite previous research that suggests persons who have strong animal attachments are indeed more sympathetic to animal welfare concerns, the heightened use of risk discourse was shown to decrease potential developments of human-animal bonds, amplifying participants' construction of penguins as a source of risk and, thus, decreasing participants' commitment to pro-environmental attitudes. In contrast, the decrease in risky behaviour language, alongside discussion of pro-environmental messages, leads to increased feelings, human-animal bonds and pro-environmental attitudes.

In both Chapters 3 and 4, the results speak to the first research question this study sought to explore on how prior cultural influences biased participants' attitudes regarding the environment prior to, and arising from, the Penguin Encounter. Prior research suggests media and prior exposure to nature play an important role in publics understanding of science, although little is known about the influence of these sources on publics' participation in science activities. Existing research drawn from the fields of science communication, science and technology studies, anthrozoology, museum studies and science education suggests family discussions, watching films, reading books and prior related experiences affect how publics engage with environmental activities at zoos (Eagles and Demare, 1999). Visitor studies in zoos highlight similar findings, suggesting media influences, certainly popular animated films, have a lasting impact on public perceptions of the

environment (Jensen and Wagoner, 2011; Whitley, 2008). Yet, little research has been conducted on how zoos, and other informal learning organisations, utilise these cultural sources to extend their own education messages.

The findings of this study demonstrate how the cultural industry is able to influence perceptions of expertise and the environment. The cultural industry was found to affect participant perceptions of the environment in two key ways:

- the rhetoric and representation of the environment by popular cultural figures were often in contention with the rhetoric of the zookeepers' interpretation of the environment *and*
- the cultural industry was often cited as influential to participants' portrayal of penguins.

The role of these factors was related to the pro-environmental attitudes of participants, and thus related to the potential to positively impact participant's pro-environmental attitudes. Indeed, the role of cultural industry has significantly altered from whom publics' gather 'truthful' science information (Yearly, 2005). Assessing these findings in light of the long history of science communication in zoos has implications for how we analyse publics' construction of social scientific knowledge.

Chapter 3 details the importance of popular media such as animated films, nature documentaries and social media, in the historical construction of participant's understanding of the environment, as evidenced by their referencing of popular science celebrities, including Sir David Attenborough, when discussing

their own knowledge of environmental issues. Existing research on celebrities in science have pointed to their charisma and ability to bring environmental science to people in a transparent, interesting form (Huggan, 2013; Boykoff and Goodman, 2009). In doing so, science celebrities develop a pattern of shared environmental science knowledge and construct of the natural world. The knowledge participants gain from science celebrities ultimately influences how pro-environmental messages gain traction, are distorted, or ignored by the participant.

Participants' belief in celebrities as trustworthy and knowledgeable sources was a key factor in determining whether participants would trust the knowledge put forward by ZSL. This study found participants were either highly trusting of zookeepers or placed their trust in other figures, notably nature-related celebrities. If participants choose to discuss the penguins, particularly their conservation status, they often employed knowledge gleaned from popular media celebrities. They did so in such a way that they negotiated their participation in the encounter through their knowledge of penguins and nature derived from popular media. Zookeepers, who acknowledged and validated participant knowledge, ultimately improved participant's adaptation of information from their experience into their existing frameworks. Whereas, the opposite was true if zookeepers question or fail to validate information participants gathered from popular media celebrities. The recognition of participant's knowledge gained from celebrities, certainly celebrities such as Sir David Attenborough, is essential to fully engaging the participants. Adapted celebrity discourse, as well as other sociocultural influences, form a part of

participant's complex knowledge of the environment. From the findings, it is obvious these complex knowledges are built over long periods of time. For ZSL to be successful in transmitting their educational messages, their messages must make connections with participant's existing knowledge frameworks (Sousa, 2000). Thus, the fact that participants had watched and listened to Sir David Attenborough for a substantial part of their lives is essential to understanding how and why participants engage with interpretive messages during the Penguin Encounter.

Not only is popular media an influential aspect of participant involvement in environmental science engagement, previous experiences with nature, including in this case non-human animals, and environmental engagement practices are key in the development of pro-environmental attitudes (Osborne *et. al.*, 2003). Interrogating participant involvement in other environmental science engagement practices highlighted two unifying features of all the participants: prior visitation at a zoo or science centre, and pet ownership. The data suggests that for participants, relationships between themselves and their pets, or other animals, influenced participant's pre-visit pro-environmental attitudes. For example, although participants may have expressed they were not highly knowledgeable regarding the ecology or biology of penguins, they expressed positive dispositions towards the needs and emotions of animals. The positive disposition of participants connects with prior research, which suggests participants, from a young age, develop emotional connections to animals, which are transferred to other aspects of environment (Markman, 1989; Kellert, 1985). Indeed, these previous research

studies suggest publics construct emotional and moral concern for nature from sociocultural interactions with nonhuman animals (Rowan, 1991, Kellert, 1985). The analysis of the data before, during and after the Penguin Encounter suggests participant's interactions with the penguins, mediated by the zookeepers, affected participants' dispositions towards pro-environmental attitudes. Thus, the effects of these interactions are pertinent in discussing how pro-environmental attitudes can be positively influenced.

The findings in this section take a sociocultural view of science communication. These findings build on the work of Vygotsky, whose research suggested participants arrive at the zoo with complex knowledge structures of environmental issues (Vygotsky, 1978). The results set out the historical sociocultural experiences that are considered important or of high value in the communication of environmental issues. These sociocultural experiences contribute to the maintenance, reproduction and construction of participant's ultimate pro-environmental attitudes. As a result of participant's disposition towards environmental issues can be understood by their pre-visit environmental knowledge and experiences.

The findings of this study suggest that pro-environmental attitudes are constructed and deconstructed over time, and the impacts to pro-environmental attitudes through participation in Penguin Encounters are limited. As shown in Chapter 4, a fundamental property of science communication in zoos is the establishment of expertise, such that there is a division of expert scientists and lay

publics, thus preventing participants to engage in two-way dialogue with zookeepers. From the perspective of participants, their knowledge was either disregarded or participants self-doubted their assessment of penguin needs. For example, participants did not feel they were able to understand the needs of penguins to the same degree as zookeepers. Thus, from the perspective of human-animal interactions, their participation in the building a bond with the penguins was limited by their perceived non-expert status. ZSL contributed to the environmental risk discourse through risky behaviour rhetoric, which ultimately led to some participants disassociating themselves with the penguins, although overall participants felt penguins needed cared for by people. The findings of this study suggest participants' perceptions of penguins and the environment, in general and in practice, demonstrated penguin encounters were not a useful tool in communicating environmental issues, with the intention of expending participants' pro-environmental attitudes.

In summary, the findings of this research contribute to the fields of science communication, human-animal studies, science and technology studies and museum studies by identifying the potential for capitalising on the research of human-animal bonds and science communication to improve public interest in pro-environmental issues. These findings suggest that prior experience, combined with the ZSL's framing of the Zoo's expertise and environment crisis, all contribute to the ultimate accommodation for and assimilation of ZSL's pro-environmental concerns. The findings of this study contribute to a novel understanding of two core-

phenomenon of why and how human-animal interactions function as a mechanism for impacting participant's pro-environmental attitudes in the context of ZSL's Penguin Encounters. Findings from Chapter 4 suggest construction of expertise is a complex sociocultural process by which organisational expertise is built over a long period of time and is often in contention with participant's prior experiences and media discourse. While findings from Chapter 5 suggest that understanding the current state of risk society discourse is essential. The findings of this study suggest that attitude change through environmental science communication is a complex issue. This is the first study of this kind and further research is needed to explore a more detailed construction of public understandings of environmental issues through mediated human-animal interactions. Zoos can play a role in constructing pro-environmental attitudes, if discourses of risk are redrafted.

5.3. Methodological Contributions

The methodological approaches of this study contribute to novel directions in researching interactive environmental science communication strategies. Firstly, the theoretical methodological contributions of this study on the application of the trajectory equifinality model within this field of research. Secondly, this thesis contributes to the methodological details of carrying out impact research within interactive environmental science communication.

The findings and theoretical contributions of this study suggest that taking a more detailed approach to science communication research, centring on the key events in an individual's life trajectory influences the experience in a way not

previously studied. Studying participant's individual experiences is useful in terms of understanding how and why individuals assimilate environmental messages and to understand the complexity of the sociocultural aspects of environmental science. Research within sociology, psychology and other cultural studies concerned with public understanding of science have long taken a narrow approach to examining how and why people engage with environmental science, minimizing the power of the sociocultural aspects of the participant's disposition. One of biggest drawbacks of previous research has been the lack of research on the broad sociocultural factors of the experience.

Indeed, within sociocultural studies of science communication, public understanding of science has been explored using a narrow perspective of sociocultural influences. For example, research in science centres or zoos tends to focus on the specific event or programme, with limited concern for the broader sociocultural implications (see for example: Achiam and Marandino, 2014; Azevedo, 2011; Mortensen, 2010; Wilkinson, Bultitude, et al., 2011). In one such study, Coffee (2015) explores the dialogic and social practices within museum practices. He suggests in studying the sociocultural practices of museum visitors, museums can investigate how they function as communication spaces. Yet, the entire focus of this research is on sociocultural influences of the museum visitor, omitting the larger set of environmental sociocultural contexts, which may directly influence how visitors participate in the context of the museums' interactive science communication activities. Even within theoretical work, such as that produced by

Falk and Dierking (2000), the research exhibits a disconnection between practice and broader contexts, offering little empirical evidence of the implications of the broad sociocultural context of the individuals' lives. To explore the multifaceted nature of sociocultural experiences, research in science communication and the public understanding of science needs to develop a robust, empirically based, research methodology. This study has shown that a broader exploration of the implications of the sociocultural contexts is possible through a combination of approaches from sociology, psychology and science communication studies, and is useful perspective from which to carry out research on the potential impacts of museum communication programmes.

The use of an impact measure is essential in understanding how and why participants' construct their pro-environmental attitudes, including how these constructs are influenced during the Penguin Encounter. In Wagoner and Jensen's (2015) critique of the Trajectory Equifinality Model they specifically critique the model's reliance on retrospective analysis. Indeed, Jensen and Wagoner point out the flaws of analysing the participant trajectories using simply a retrospective approach:

> "By only looking retrospectively, the researcher lacks important details about the setting, the range of options under consideration prospectively, and the complex set of factors (including embodied dimensions of an experience) that affect how a life trajectory develops." (Wagoner and Jensen, 2015, p. 115)

This critique is meaningful in light of impact research, which seeks to "[establish] what works and why" in science communication (Owen and Rogers, 1999, p. 256).

Impact evaluation is critical in understanding if ZSL successfully delivers messages, which are well received by their visitors and achieve ZSL's intended outcome of creating pro-environmental behaviour change.

Analysing participant experiences are complicated and require not just one stage of evaluation, but require at least, pre-visit and post-visit evaluation to explore how and why participants' involvement in the Penguin Encounter is (or is not) useful. In the context of this research, the Penguin Encounter was designed as an interactive interpretive exhibition to build pro-environmental knowledge and to encourage pro-environmental attitude change. To do so, "measuring learning required (at minimum) direct measurement of visitors' thinking or attitudes before and after the intervention" (Jensen, 2014, p.2). Indeed, the primary methodological suggestion arising from this research is for more studies to measure attitudes at multiple stages, including prior to, and throughout, an intervention.

5.4. Limitations

This study sought to understand how and why mediated human-animal interactions in zoos impacted participants' pro-environmental attitudes. The findings contribute a more detailed, empirically based understanding of publics' pro-environmental attitudes, as well as a depiction of the variability and how the individuality of sociocultural experiences contributes to the possible development of environmental attitudes. However, there were also particular methodological and theoretical limitations to this study that ought to be taken into account. One of the primary limitations to the study was in terms of participant recruitment. The

methodology of the study influenced the number of participants recruited for the study. Drawing on Sato, et. al. (2012) recommendations, as well as previous research on trajectory models, this study originally sought to recruit at least 10 pairs of participants.

Without contact details, or assistance from the organisation, identifying, recruiting and carrying out research with participants who had paid for the experience was difficult. Recruiting participants who, in order to participate in this study meant I needed to collect detailed pre-visit data, was not straightforward. Understandably most visitors, who had purchased tickets to the Penguin Encounter and were contacted at the gates of the zoo as they entered, were unwilling to devote time to the research, without prior invitation. Although 20 visitors were invited to participate using this method, not one agreed to participate in the study. Ultimately, 10 Penguin Encounter tickets were purchased by the researcher and filled using an advertisement. The first 10 people to volunteer were selected. Therefore, the findings above must be considered in relation to the method of selecting participants. Given the methodology of this research, there are several limitations in generalising these findings to broader zoo-based human-animal programmes, nevertheless environmental communication programmes will benefit from this new perspective on the assimilation of pro-environmental attitudes.

The findings of this study are not infinitely representative of mediated human-animal interactions at ZSL; the results are specific to the research participants and the contexts of their lives at the time of data collection. These

findings cannot be applied to everyone who participates in an animal encounter at London Zoo, or elsewhere, as visitors to zoos have varying histories and motives. Indeed, visitors attend zoos with varying cultural interests, as identity-related needs and sociocultural variables (including gender, age and ethnicity) (Falk, 2009; Dawson and Jensen, 2011). While, pro-environmental science communication programmes may vary considerably in the location of the programme, the qualifications of the facilitators, the interpretive discourse and variation in how the human-animal encounters are facilitated. For example there are programmes which do not restrict access to the penguins, and some allow participants to feed the penguins.

This research was designed as an exploratory study of mediated human-animal interactions as a mechanism for developing pro-environmental attitudes. As one of the first ethnographic observation studies, including a mixed-methods survey, analysing a small number of participants was necessary to develop the TEM models. In the scope of this research, a larger, more diverse participant group may have confounded the research. Furthermore, the key findings of this study emerged from data collected from every individual, which when collectively analysed suggest patterns that may be applicable to the general experiences of Penguin Encounter participants.

This study was particularly limited by the lack of a longitudinal approach. The longitudinal approach should be incorporated to “acknowledge complexity, change over time and the interwoven and developmental nature of sociocultural

variables" (Jensen & Wagoner 2010) influencing visitors' appropriation of new ideas and experiences encountered at nature and wildlife tourism sites (Dawson & Jensen 2011, p.12). Longitudinal approaches seek to investigate changes in attitudes and behaviours resulting from interventions. This study used a transformation process, detailing the impacts of the Penguin Encounter. Ultimately however, this study cannot be described as fully longitudinal, but simply a study of the immediate influences of the Penguin Encounters. What the research doesn't explain is the degree to which the impacts detailed are fleeting or enduring. In regard to the complex role of pro-environmental communication in sustaining processes of attitude and behaviour change, it would be pertinent to conduct longitudinal case studies of mediated human-animal interactions in zoos.

5.5. The implications of this study

These results have several implications for environmental science communication studies, ranging from theoretical research perspectives to practical applications. The findings of this study suggest several factors were involved in the development of participants' environmental attitudes. A key finding, which has implications for how environmental issues are conveyed, is the way in which participant attitudes could be improved through optimistic, favourable interpretation. Chapters 4 and 5 suggest that participants' acceptance of expertise, and in turn environmental-messages, were deeply embedded. Therefore, adjusting the way in which zookeepers, as well as the zoo at large, engage with participants is essential to improving practices of environmental science communication. Training

for zookeepers in facilitating education sessions should include an expanded mission to understand the sociocultural influences on their visitors, and thus understand sources of visitor preconceptions. In addition, reframing the interpretation, to incorporate these external sources of expertise, may encourage a broader range of visitors to feel they are able to connect with, and take responsibility for, nature and environmental issues. Yet, attempting to address the lack of acceptance or participation in environmental conservation programmes by changing practices around language use in ZSL's education programmes may not be enough. Indeed, there are many influences at work, which ultimately change the patterns of how and why participants ultimately alter their attitudes towards, and interests in, conservation pursuits. Thus, to encourage improvements in environmental science communication practices, changes may need to occur on many fronts in order to make a difference to patterns of decreased interest and lack of participation in conservation issues. To do so, the sociocultural influences and elements of visitors' prior understanding of environmental issues need to be incorporated into understanding how and why visitors adopt zoo-based environmental messages.

Indeed, the models of expertise and risk communication represent hypotheses of how and why visitors adopt zoo-based environmental messages, based on two arising discourses in human-animal interaction. Each model details the critical factors and junctures which ultimately shape visitors' attitudes and interests in species level environmental issues. More research is needed to test

these hypotheses and explore the degree to which the model depicts the realised trajectory of zoo visitors participating in varying human-animal encounters. The next steps and future research should explore verifying the models, through extensive surveying of key obligatory passage points (prior to entering the encounter, following the encounter), identifying how micro-variations in visitor participation depict ultimate changes in conservation-based attitudes.

The findings also imply that at this stage, zoos may need to reconsider the benefits of human-animal encounters for improving pro-environmental behaviours. If indeed, the aim of human-animal encounters is to create environments for building bonds between visitors and animals at the species level, then zoos need to consider how and why certain visitors build those bonds, while other visitors do not. This study has demonstrated that while participants gained an overall understanding of penguin characteristics, the majority of participants are not creating bonds with penguins, nor improving their pro-environmental attitudes. Human-animal bonds appear to be limited by keeper behaviours and the use of language meant to distance the visitors from the penguins. Thus, without improving the spaces zoos provide for building human-animal bonds, current practices are futile in improving pro-environmental attitudes.

5.6. Directions for Future Research

This study has contributed to research on science communication and human-animal interactions in zoological spaces by providing a better understanding of why and how visitors to zoos trust environmental crisis messages, as well as

insights into the potential influences of human-animal bonds in constructing pro-environmental concerns. These contributions, as well as their limitations, have implications for potentially valuable directions in the future research. Areas of research, the rationale for their investigation, and potential research questions are outlined in this section.

As suggested in the implications outlined above, there is scope for developing research strategies to explore human-animal interaction programmes as a mechanism for environmental communication more broadly in at least four ways. Firstly, by exploring a wider-range of human-animal interaction programmes, research should investigate the role of interpretive conversation in mediating participant's pro-environmental attitudes, such as comparing the frames institutions use in developing their interpretive strategies. Secondly, our understanding of the sociocultural effects on pro-environmental messages within zoo, and science centre, programmes could be extended by conducting further research on publics' existing frameworks within a broader range of science communication activities beyond these institutions. Thirdly, a broader programme of research could explore the relationship between sociocultural dimensions, human-animal interactions and varying interventions. Finally, future research questions should explore factors such as the influence of using non-risk language in interpretation, aspiring to exonerate visitors from the burden of feeling responsible for the current conservation crisis.

Research that could build a broader empirical understanding of the attitudes and behaviours of people who participate in human-animal encounters would help to give insight to the limited perspectives currently available in research on public participation environmental conservation practices following a zoo-based environmental communication intervention. Additionally, applying Watermeyer's (2012) notion of the *post-museum*, further research could explore how the zoos could use their human-animal encounter spaces as locations for an "immersive knowledge experience [that facilitate] conceptual and strategic directions in public engagement with science" (p. 1). Indeed, research into what could be called a post-zoo would encourage the use of human-animal interactions as an immersive space for visitors to not only interact with penguins, but to also act as a location for publics and practitioners to engage in collaboration regarding the direction of the zoo's conservation goals.

Finally, an important avenue of future research is to better understand how human-animal interactions can act as a mechanism for improving pro-environmental attitudes. As the limitations of this study suggest, little is known about the influences of participating in human-animal encounters in zoos, nor is there significant research on the connection between human interest in wildlife and pro-environmental attitudes. While others have suggested conducting visitor engagement sessions with individual animals may have the potential to improve visitor connection to the natural world, this current research study fails to conclusively prove human-animal interactions are beneficial to improving beliefs

about the importance of conservation, species preservation, sustainable behaviours and the role of zoos in contributing to these factors. It may be that the prior experiences and shared interests of the participants (such as pet ownership and self-reported interest in wildlife) are aligned with these results, and variation in these unique circumstances may be influential to visitors' propensity towards pro-environmental attitude change.

5.7. Afterword

Overall, this study has sought to explore the potential for human-animal interactions, mediated by pro-environmental interpretation in zoos, to positively impact pro-environmental attitudes, and ultimately improve pro-environmental behaviours. This study was undertaken due to my own interests in the potential of human-animal bonds and concerns I had regarding the ever-growing environmental crisis. In searching for a project, chats with zoo educators lead me to research this as a legitimate genre of science communication.

The findings of this study suggest that human-animal interactions, as a genre of science communication, do not have a high positive impact on pro-environmental attitudes, although they do have a slight positive impact on factual knowledge. Additionally, this study found one-off animal encounters do not facilitate human-animal bonds. Indeed, due to issues of expertise and risk, animal encounters often-diminished potential for bonding with animals. The primary contribution of this study to knowledge is the depiction of the variability and individuality of sociocultural experiences, as a crucial move towards deeply

understanding the many influences of science communication. These findings suggest pro-environmental attitudes are a complex phenomenon that involves a multitude of cultural elements and social relationships, constructed and deconstructed as participants encounter environment and nature issues.

This research was carried out with the intention to contribute to the practice of environmental communication by developing a robust understanding of the experiences and attitudes of visitors to zoos, and in doing so make it possible to improve how pro-environmental messages are perceived and addressed. If zoos hope to influence public perceptions of the environment, by providing opportunities for publics to develop bonds with animals, they must first re-evaluate their science communication rhetoric. Without valuing participants' prior experiences, and by acting as gatekeepers, the animals become inaccessible to participants, thus becoming irrelevant to their lives.

While this study alone cannot answer all questions related to the variability and individuality of sociocultural experiences, it does set the groundwork for further empirical studies on the impacts of human-animal interactions in zoo and their basis for pro-environmental science communication through these mechanisms. This study is a small part of what will hopefully be a broader, on-going research agenda.

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Appendix A: Questionnaire Responses

-	Cam.	Ilona	Chel.	Diane	Megan	Eliz.	Char.	Susan	Sandra	Cand.
BV: The penguins at the zoo are happy	9	7	7	8	7	7	7	7	5	4
AV: The penguins at the zoo are happy	8	8	7	9	8	8	9	8	6	4
Change in penguins are happy	-1	1	0	1	1	1	2	1	1	0
BV: A penguin could make a good companion	6	9	9	6	4	6	1	1	2	3
AV: A penguin could make a good companion	3	5	9	7	2	5	1	1	5	3
Change in penguins could make a good companion	-3	-4	0	1	-2	-1	0	0	3	0
BV: I would be unhappy if I could no longer come into contact with penguins	7	9	6	5	5	7	1	1	1	2
AV: I would be unhappy if I could no longer come into contact with penguins	5	6	6	8	5	5	1	1	1	4
Change in unhappy if unable to come into contact with penguins	-2	-3	0	3	0	-2	0	0	0	2
BV: Penguins dislike being around people	5	2	2	3	5	4	3	5	4	4
AV: Penguins dislike being around people.	6	7	2	1	5	6	5	6	5	3
Change in penguins dislike being around people	1	5	0	-2	0	2	2	1	1	-1
BV: Penguins have unique personalities.	6	9	9	9	8	6	9	9	5	6
AV: Penguins have unique personalities	7	7	9	8	8	8	8	9	4	7
Change in penguins have unique personalities	1	-2	0	-1	0	2	-1	0	-1	1
BV: Penguins deserve as much respect as people	7	9	9	9	8	9	9	9	7	7
AV: Penguins deserve as much respect as people	7	9	9	9	7	8	9	9	7	7
Change in penguins deserve respect	0	0	0	0	-1	-1	0	0	0	0
BV: It is important that zoos offer close encounter experiences with penguins.	7	9	5	7	7	7	5	6	7	7

AV: It is important that zoos offer close encounter experiences with penguins.	7	7	5	5	6	5	5	6	7	6
Change in zoos offer close encounters	0	-2	0	-2	-1	-2	0	0	0	-1
BV: Penguins enjoy living here at the zoo	9	7	8	7	6	5	7	7	6	6
AV: Penguins enjoy living here at the zoo	9	8	7	7	8	6	6	6	5	6
Change in penguins enjoy living at the zoo	0	1	-1	0	2	1	-1	-1	-1	0
BV:If I were hungry, it would be okay to eat a penguin	8	1	5	1	4	5	6	2	1	6
AV: If I were hungry, it would be okay to eat a penguin	9	1	1	1	7	5	5	2	6	6
Change in eat a penguin	1	0	-4	0	3	0	-1	0	5	0
BV: Penguins need to be cared for by people	1	5	1	2	2	4	2	6	1	7
AV: Penguins need to be cared for by people	3	5	6	4	2	2	6	6	4	8
Change in penguins cared for by people	2	0	5	2	0	-2	4	0	3	1
BV: It is not possible to tell if a penguin is angry.	8	7	7	7	8	5	7	8	7	5
AV: It is not possible to tell if a penguin is angry.	6	9	8	6	8	9	9	6	7	7
Change in penguin angry	-2	2	1	-1	0	4	2	-2	0	2

Appendix B: Questionnaire Responses

	Cameron	Ilona	Chelsea	Diane	Megan	Elizabeth	
BV: CD1	3	2	2	3	0	2	
AV: CD1	1	1	3	2	3	1	
Change in CD1	-2	-1	1	-1	3	-1	
BV: CD2	3	3	2	3	0	2	
AV: CD2	3	2	2	3	2	3	
Change in CD2	0	-1	0	0	2	1	
BV: CD3	3	2	1	3	0	1	
AV: CD3	2	2	1	3	1	2	
Change in CD3	-1	0	0	0	1	1	
BV: CD4	3	2	2	3	1	3	
AV: CD4	3	3	1	3	2	3	
Change in CD4	0	1	-1	0	1	0	
BV: CD5	3	2	3	3	1	3	
AV: CD5	3	3	1	3	2	3	
Change in CD5	0	1	-2	0	1	0	
BV: CD6	3	3	3	3	0	2	
AV: CD6	3	2	1	3	2	1	
Change in CD6	0	-1	-2	0	2	-1	
BV: E1	1	2	1	2	2	2	
AV: E1	2	2	2	2	1	2	
Change in	1	0	1	0	-1	0	
BV: E2	2	2	2	2	1	2	
AV: E2	1	1	2	1	2	1	
Change in	-1	-1	0	-1	1	-1	
BV: E3	1	1	1	1	1	1	
AV: E3	1	1	1	1	1	1	
Change in	0	0	0	0	0	0	
BV: E4	1	1	1	1	1	1	
AV: E4	1	1	1	1	1	1	
Change in	0	0	0	0	0	0	
BV: E5	1	2	1	2	1	1	

AV: E5	2	1	2	1	1	1	
Change in E5	1	-1	1	-1	0	0	
BV: E6	1	2	1	2	1	2	
AV: E6	1	2	2	1	1	1	
Change in E6	0	0	1	-1	0	-1	
BV: E7	1	1	1	1	2	1	
AV: E7	1	1	1	2	1	2	
Change in E7	0	0	0	1	-1	1	
BV: E8	2	1	2	1	1	1	
AV: E8	2	1	1	1	2	1	
Change in E8	0	0	-1	0	1	0	
BV: R1	2	3	3	3	1	2	
AV: R1	3	3	2	3	3	1	
Change in R1	1	0	-1	0	2	-1	
BV: R2	1	1	1	1	2	1	
AV: R2	1	1	2	1	1	2	
Change in R2	0	0	1	0	-1	1	
BV: R3	1	1	1	1	1	1	
AV: R3	1	1	1	1	1	1	
Change in R3	0	0	0	0	0	0	
BV: R4	1	3	3	3	1	2	
AV: R4	3	3	3	3	2	2	
Change in R4	2	0	0	0	1	0	
BV: R5	3	3	2	3	2	3	
AV: R5	3	3	3	3	3	2	
Change in R5	0	0	1	0	1	-1	
BV: R6	1	2	3	3	1	2	
AV: R6	3	2	3	3	1	1	
Change in R6	2	0	0	0	0	-1	

Appendix C: Informed Consent to Participate

Informed Consent to Participate in
"Human-Animal Relationships: Impacts of Close Encounter Experiences in UK Zoos"

Monae Verbeke, Department of Sociology at the University of Warwick, is conducting this study. She can be reached at mcverbeke@gmail.com for questions or concerns. You may also contact the University of Warwick Department of Sociology Research Administrator at +44 (024) 7615 1876 if you have any questions or comments regarding your rights as a participant in this research. This project has been reviewed according to University of Warwick procedures governing your participation in this research. Researchers at ZSL London Zoo, Chester Zoo, and the University of Warwick have informed this study design.

I understand that I have the opportunity to be a participant in a unique study on close encounter experiences at London Zoo. I also understand that the experience encounters are being evaluated to ensure London Zoo delivers the highest quality programming and that the data developed as a result of my participation in this study will inform the delivery of experience programmes at London Zoo. Additionally, my participation will inform the broader field of human-animal relationships.

I understand that the experience encounter in which I will be partaking will give me the opportunity to come into contact with animals at London Zoo. Animal behavior cannot always be predicted. The animals in this study are of low risk and it is unlikely that I will come to any harm. However, it is important to discuss in advance the risks and rules needed to insure the animals and my safety and health. I will(have) receive(d) a separate consent and release of liability form from London Zoo that must be signed prior to my participation in the experience encounter.

I understand that as part of the experience encounter research project, my experience will be recorded. This data will include both audio and visual elements. This information and my responses to the pre- and post- questionnaires will be recorded. The data collected will be used to evaluate the potential impacts of these programmes. Although the results of this research will be published, the data generated from my participation will be kept confidential.

I understand that as part of this evaluation process, I will be recorded during my experience and I may be asked a number of questions, which will also be recorded. The purpose of the recording is to analyze participant behavior while engaging in a unique up-close encounter with an animal, in a zoo setting. The video data as well as all other data will

remain strictly confidential. All data collected in this study will be confidential; all person-identifiable data will be coded so that I cannot be identified. For participating, I will receive a video of the experience to keep as a souvenir after the completion of the study.

I have been given an opportunity to ask questions about the research study, the procedures to be used and future use of the data; I believe that I have sufficient information to give this informed consent. I understand that I may withdraw this consent at any time and discontinue my participation in this project, in which case I give up any compensation for my participation. However, until I do, I consent to the procedures described above.

SIGNATURE EMAIL

In the case of children, parent/guardian PHONE

DATE

Appendix D: Informed Consent Form

"Human-Animal Relationships: Impacts of Close Encounter Experiences in UK Zoos" Study Information

Purpose of the Study:

This is a study in social project that is being conducted by Monae Verbeke, PhD student at the University of Warwick. The project aims are to review existing evidence on or related to 'close-encounters' with animals in order to build a better picture of the extent and effectiveness of current programmes available and learn from the experience of participating in 'close-encounters' to determine the effectiveness of the existing programme. The research is primarily original research (consisting of surveys, observations and interviews), but also includes secondary research (drawing on review of published and grey literature).

What will be Done:

This will involve either participation in an interview or experience encounter. In order to capture as much as possible, we will audio record the encounter and any interviews.

Interviews with London Zoo staff will consist of short, semi-structured questions. Interviews seek to gather supplemental information to the study of experience encounter participants. Information will be gathered on the staff's personal experiences with the penguin encounters and staff's perceptions of the goals and objectives of up close encounters with animals.

Experience encounter participants will partake in the following 3 components:

A. You will complete an online questionnaire, which will take 10-15 minutes to complete. The survey includes questions about your expectations. Other survey questions will address your perceptions of the penguins and your experience with penguins. I also will ask for some demographic information (e.g., age, number of children, education level) so that I can accurately describe the general traits of the participants in the study.
B. Prior to seeing the penguins on the day of your visit, I ask that you to wear a small camera. This helps us see what experiences you partake in and the interactions between yourself and the penguins. Following your participation, I will provide a video of your experience to you.
C. Following your experience you will be sent a follow-up questionnaire, which will be very similar to the initial questionnaire. The purpose of this questionnaire is to examine the impact of the close-encounter experience.

Benefits of this Study:

You will be contributing to knowledge regarding human and animal interactions and the role close encounters play in conservation programmes. After I have finished data collection, I also will provide you with more detailed information regarding the research findings.

Risks or Discomforts:

No risks or discomforts are anticipated from taking part in this study. If you feel uncomfortable with a question, you can skip that question. If you decide to quit at any time before you have finished the questionnaire, your answers will NOT be recorded and you will not receive any of the stated benefits.

Confidentiality:

Your responses will be kept confidential. I will ask you to include your name and an e-mail address when you participate, as to identify you, if I need to contact you again. Your data will be assigned a pseudonym, and only the pseudonym will appear with your responses. Only the researcher will see your individual data. The list of e-mail and weblog addresses of my participants will be stored electronically in a password-protected folder; a hard copy will be stored in a locked filing cabinet.

I will NOT include any names or nicknames you use, nor will I include your email address along with any quotations I use in professional papers or presentations.

Decision to Quit at Any Time:

Your participation is voluntary; you are free to withdraw your participation from this study. You also may choose to skip any questions that you do not wish to answer.

How the Findings will be Used:

The results of the study will be used for scholarly purposes and to assist in influencing animal policies. The results from the study will be presented in educational settings and at professional conferences, and the results will be published in a professional journal in the field of sociology and zoology. Because I will ask you about a number of different aspects of your experience, it is likely that I will use your data to address multiple questions regarding human-animal relationships.

Contact Information:

If you have concerns or questions about this study, please contact Monae Verbeke at m.verbeke@warwick.ac.uk.

By beginning the survey, you acknowledge that you have read this information and agree to participate in this research, with the knowledge that you are free to withdraw your participation at any time.